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# 北海道に於ける *Circoporella semiclathrata* HAYASAKA の發見*

理學博士　矢部長克

理學博士　杉山敏郎

（昭和 15 年 10 月 12 日講演並に受理）

昨秋 10 月筆者等は北海道札幌にて開催の日本古生物學會に出席を兼ねて北海道膽振國右左府•日高國岩知志を中心として略ぼ南北に發達する所謂綠色片狀岩類の調査を試みた。此綠色片狀岩類は嘗ては神居古潭系に屬するものではなからうかと見做されたことあり，主として片狀の輝綠凝灰岩・粘板岩及び硬砂岩よりなるが，この外に數枚の角岩 (chert) 並に灰色乃至暗灰色石灰岩を伴ふ。ペペシュル川（鵡川上流パンケシュル川の 1 支流）に露出するものには藍閃石 (glaucophane) を含む綠色片岩（吉井正敏理學士の鑑定による）を挾在してゐる。筆者等は既に (1) 膽振國勇拂郡占冠中央ペペシュル川下流（入口より）2.5 km，(2) 日高國沙流郡幌去村岩知志＝セウ川入口，(3) ＝セウ川入口東方約 6 km の 3 地點から夫々採集せられた石灰岩中の化石を研究し，下の如き種屬を識別した。

*Pycnoporidium lobatum* YABE et TOYAMA (1)
*Microsolena* ? sp. indet. (1)
Chaetetoid coral, gen. et sp. indet. (2)
*Heptastylopsis asiatica* YABE et SUGIYAMA (3)

是等の化石によつて上揭 3 地域の石灰岩を含む地層は共に上部珠羅紀の鳥ノ巢統並に橋本亘理學士の奈江川チヤート層に略ぼ對比して大過なからんことを提唱した。尤も *Microsolena*? は見事の標本であるが轉石であるので，その層位上の價値を著しく減ずる故この化石の賦存狀態を確むる必要を生じ原地の踏査を行つた。同一化石を原位置のまゝで採集することは出來なかつたが，轉石として若干採集することが出來た。更にペペシュル川流域にては數枚の石灰岩が輝綠凝灰岩を主體とする地層中に介在してゐることを確め得，是等石灰岩のあるものには鳥ノ巢石灰岩に普通發見せらるる *Heptastylopisis asiatica*, *Thamnastrea* 等の六射珊瑚類が相當多數含まれてゐることを知ることが出來た。更に岩知志新日東鑛山東方 1.7 km の砂流川東岸に露出する暗灰色石灰岩からは餘り保存は良好ではないが石灰海藻及び種屬不明の六射珊瑚類の外に *Nerinea* (s. s.) 及び *Circoporella semiclathrata* HAYASAKA に同定出來る化石を採集することが出來た。最後の化石は在來本邦にては鳥ノ巢石灰岩の化石中重要な役割を占め，既に下記の如く各地の鳥ノ巢石灰岩から知られてゐる。

1)　福島縣相馬郡上眞野村橲原（ジサハラ）の東方
2)　東京府西多摩郡五日市町樽
3)　高知縣高岡郡加茂村耳飛田（ミトダ）
4)　愛媛郡東宇和郡野村町小落（コオトシ）

殊に樽及び耳飛田に多產し，通常六射珊瑚類・ストロマトポロイド•石灰海藻及び *Cidaris* の棘等と共產する。

從來層位學的に又化石上殊に放散蟲類の研究から鳥ノ巢統が北海道にも發達してゐるのではなか

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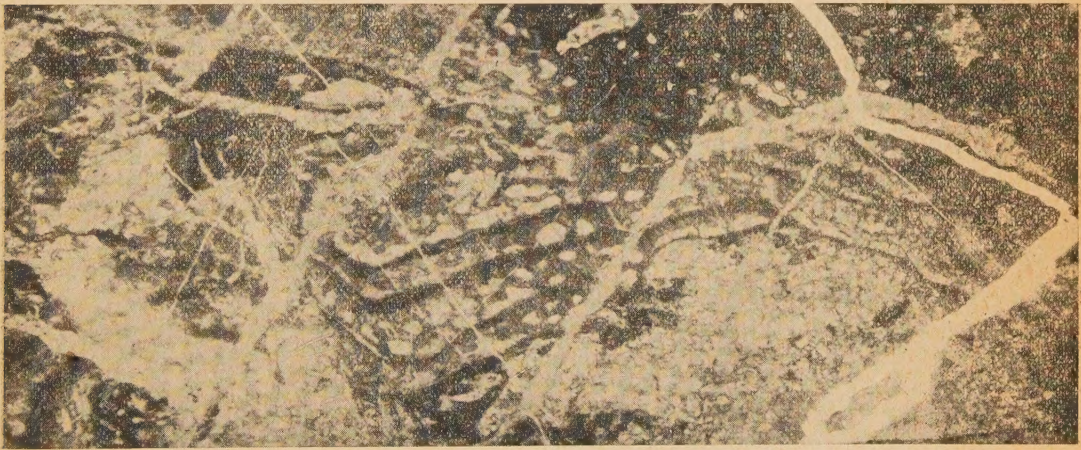
らうかと推定せられて居つたが，化石學上充分に之を立證し得たとは見做し難かつた。筆者等も右左府——岩知志一帶の綠色片狀の輝綠凝灰岩類中の石灰岩の化石は上部珠羅紀鳥ノ巣石灰岩產のものと區別出來ないが，一方北海道の *Orbitolina*（オルビトリナ）石灰岩中の化石が今日相當判明して來て鳥ノ巣統のものとも共通種屬も少なくないので，實地踏查に際して鳥ノ巣石灰岩のみに在來分布が限られてゐる化石の發見につとめた。併し今回の踏查によつて鳥ノ巣石灰岩に多產する六射珊瑚類・石灰海藻類・*Nerinea* 及び *Circoporella semiclathrata* の產することが明になつた。殊に從來の記錄から見れば本邦にては *Circoporella semiclathrata* は鳥ノ巣石灰岩以外の地層からは未だ報告されてゐない。從つて此の事實は上揭地域に發達する綠色片狀の輝綠凝灰岩を主體とする地層は鳥ノ巣統に對比出來ると云ふ筆者等の當初の見解を一層强調するに外ならない。

此處に *Circoporella* の層位的價値の輕重及び本屬の內部構造に關して論ずる必要がある。下に今日までにこの化石に關して報ぜられたる見解の大樣を述べておく。

*Circoporella* は 1917 年早坂一郎博士によつて高知縣高岡郡加茂村耳飛田產の標本を基として設けられ，同氏は *Circoporella semiclathrata* を基型種として下の如き定義を揭げてゐる。

Coenosteum or hydrophyton massive, incrusting, composed of two skeletal elements, concentric and radial, which remain largely distinct from each other. Concentric laminae more or less irregularly wavy on the external surface, but otherwise apparently smooth, without any trace of warts; nearly parallel to one another, thin and separated from one another by a wide interval far wider than the laminae themselves. Interlaminal spaces traversed by very numerous lamellar partitions which are sometimes reduced to mere pillars, and more or less perpendicular to the surface of the laminae; partitions usually more or less flexuous, nearly as thick as the concentric laminae, very variable in length and height, never extending from one into the next interlaminal space. Both concentric and radial elements are penetrated by numerous circular holes which are distributed almost without order. The interlaminal space, thus divided by the radial partitions into more or less quadratic chambers, is traversed further by a number of extremly thin, short diaphragms. Astorhizae quite well developed.



第 1 圖 *Circoporella semiclathrata* HAYASAKA 縱斷面 ×10
產地 北海道膽振國沙流郡幌去村岩知志 Reg. No. 63510

其後東北帝國大學理學部地質學古生物學教室に集められたる多數の *Circoporella semiclathrata* の標本を薄片にして詳細に研究すると早坂博士の記述した條項に多少補正を加へなければならない。同博士は骨格に星形溝 (astorhizae) の良く發達してゐることを擧げられてゐるが，一般には

稀で多くの資料中には之を認むることが出來ない。次に骨格の同心狀薄枚 (concentric laminae) の內部構造が分類上輕視出來ない役目をなすが，此點には餘り觸れてゐない。鏡下にて之を觀れば同心狀薄枚は2部分よりなり，表層と他の部分とは全く異つた構造を示してゐる。即ち表層は黑線 (dark line) 狀構造としてみられ其他の部分は淡黃褐色を示し，表層と判然と區別される特色を示してゐる。

この屬はムニーエ•シャルマ .(Munier-Chalmas) が 1916 年に佛國の上部珠羅層産の標本に創設した *Burgundia* と酷似して仲々區別し難く，專門學者の間に於いてもかれこれの意見の對立がある。併し上揭の如く *Circoporella* には星形溝があり，同心狀薄枚に 2 樣の構造が見られるに反し，*Burgundia* には既にドゥオルヌ (Dehorne) 及び最近にはプエンダー (Pfender) 氏が報じた如く，上揭の如き特色は何等認められない故，共に別個の獨立の價値ある屬と見做可きである。

*Circoporella* は早坂博士が本屬創設當時論述した如く *Circopora* 及び *Sphaeractinia* に近似の諸性質を示してゐる。筆者等も同樣なる見解を述べた事があるが，最近キイーン (Kühn) も，かかる見解に同意を述べてゐる。反之 *Burgundia* は古生代の *Clathrodictyon* に類似の構造を有すると見做す可きである。プエンダー氏が *Burgundia* に與へた定義は下の通りで，此屬の特色がよく現されてゐる。

> Il s'agit de colonies massives, souvent arrondies, d'une compacité absolue ; certains échantillons, exposés aux intempéries, se débitent plus ou moins en lames concaves ; celles-ci correspondent aux *latilaminae*, dont on peut voir l'indication dans les photographies de la planche XLII. La caractéristique de cette structure est la prédominance des lames horizontales, *les élèments lamellaires verticaux ne traversant pas plusieurs laminae.* La surface extérieure est vermiculée (Pl. XLI, 1) et ne présente *pas d'astrorhizes.* Une coupe verticale polie (Pl. XLII, 2) montre des lames superposées, plus ou moins ondulées, donnant à l'ensemble un aspect zoné, qui rappelle celui des Solénopores jurassiques des Ardennes et de la Haute-Marne. Mais si l'on observe la constitution du tissu on voit les espaces interlaminaires débités en logettes carrées par les éléments verticaux, ce qui donne lieu à une structure généralement trés réguliére. La question des tubes qui sont visibles çà et là au milieu du tissu (Pl. XLI, 2, coupe tengentielle ; 3, coupe vertcal) avait intrigue Yvonne Dehorne, qui a cependant cru pouvoir les assimilier â des *tubes zooidaux tabulés.* Au microscope enfin, la structure des éléments squelett ques ne comporte *pas de ligne noire mediane.*

本邦には未だ *Burgundia* に同定すべき化石は發見されない。然るにケラウエイ (Kellaway) 及びスミス (Smith) 兩氏の最近の報告に依れば，フランスでは Astartian から *Burgundia trinorchi* Munier-Chalmas と共に *Circoporella semiclathrata* と殆んど識別出來ない種が共産することを記載してゐる。實際兩氏の揭げたフランス産の *Circoporella semiclathrata* の寫眞並に記載から日本産の標本と如何にしてこの外國のものが區別さるべきや，筆者等も困却する程骨格の構造が酷似してゐる。全く同一種と見做す可きであらう。

*Burgundia* は歐洲にては廣き分布を示し，フランス・伊領ソマリランド・シリア・英國等が知られて居り今日では下の如く亞種とも合せて 5 種知られてゐる。

1. *Burgundia trinorchi* Munier-Chalmas（佛國）
*2. *Burgundia tutcheri* Kellaway et Smith（英國）
*3. *Burgundia tutcheri* var. *huttonae* Kellaway et Smith（英國）
4. *Burgundia ramosa* Pfender（シリア）
5. *Burgundia tertia* Zuffardi-Commerci（伊領ソマリランド）

*是等兩種はケラウェイ及びスミス兩氏に依つて *Burgundia* に入れられたが，甚だ疑はしい。兩氏の圖版並に記載に依ればその內部構造は全く別個の特色を示し，*Circoporella* にも同定することは出來ない。骨格の內部構造

はデニンガー (DENINGER) 氏がサルヂニアの上部珠羅紀層から報告せる "*Stromatopora*" *tornquisti* DENINGER に寧ろ近緣の種と見做すべきである。

茲に注意すべきは上掲 5 種は何れも上部珠羅紀層産であると云ふ事實である。更に興味あるは *Circoporella* と *Burgundia* が共産することあり，全く同一層位と見做し得べく，共に上部珠羅紀の標準化石として充分價値を供ふるものと考へられる。

本邦にては上部珠羅紀の海成層は太平洋側に於ては主として鳥ノ巣統にて代表され，西南日本にては九州・四國・紀州に跨がり帶狀をなして分布して居り，殊に關東地方にては藤本治義博士によれば數帶をなしてゐる。更に東北地方にては相馬中村地方にも見られ特異の化石を多産する石灰岩を挾在してゐるが，北上山地南部地方に發達する上部珠羅紀層は之と全く趣を異にして石灰岩を伴つてゐない。然るに北海道の上部珠羅紀層には上掲の如く特有の化石を産する石灰岩が發達してゐるので，この點では寧ろ西南日本に標式的に發達する鳥ノ巣統に類する。併し北海道のものは主として片狀の輝綠凝灰岩より構成せられてゐるので，本來の鳥ノ巣統とは著しく趣を異にしてゐる。換言すれば本邦にては上部珠羅紀の海成には 3 型の堆積層が區別される。即ち

1) 從來の意味の鳥ノ巣統，砂岩・頁岩の互層より主として構成せられ，之に石灰岩を伴ふ。
2) 砂岩・頁岩の互層，但し石灰岩を伴はない。
3) 輝綠凝灰岩を主體とし，之に石灰岩を伴ふ。

是等 3 型の上部珠羅紀海成層の相互關係を考究するは上部珠羅紀の古地理を探究する上に重要な役目をなすものである。從つて夫々別個の名稱を與ふる方が他日の研究に便利である。第 1 を在來の**鳥ノ巣型**，第 2 を**北上型**，第 3 のものを**北海道型**として區別し度い。

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# Discovery of *Circoporella semiclathrata* HAYASAKA from Hokkaidô.

(Résumé)

By

Hisakatsu YABE and Tosio SUGIYAMA

The Hydrozoan coral, *Circoporella semiclathrata* HAYASAKA is a rather rare, yet very characteristic fossil in the Torinosu limestone developed in the Outer zone of South-West Japan, and in the Kwantô and Abukuma Mountainlands of North-East Japan. Very recently it was unexpectedly discovered in a dark gray limestone intercalated in a complex chiefly of schistose schalstein exposed at the east bank of the Saru-gawa, about 1.7 km east of Sinnitô Mine in Horosari-mura, Saru-gun, Hokkaidô. Although only a fragmental one, the present material exhibits features characteristic of the coenosteum of *Circoporella semiclathrata* as described by HAYASAKA; it occurred at the locality cited in association with such fossils as *Nerinea* (s.s.), *Thamnastrea* and other hexacorals. As fully stated n the Japanese text, this species is an important key-fossil of the Upper Jurassic not only in Japan, but also in abroad.

*Circoporella* is very similar to *Sphaeractinia* in having the coenosteum composed of concentric lamellae and vertical elements, the concentric lamellae being apparently two layered under high magnification, a thin film-like layer limiting the upper surface of a thick inner lying homogeneous substance. and having astorhizae though rarely. This genus was sometimes confounded with *Burgundia* MUNIER-CHALMAS, a stromatoporoid closely allied to *Clathrodictyon* and which possess coenosteum composed of trabeculae in vertical and horizontal sets, which are homogeneous in microstructure under high magnification; further astorhizae are lacking to it and zooidal tubes are present. In the renewed examination, the writers are now confident in regarding *Burgundia* and *Circoporella* to be generically independent on account of the differences mentioned above, and the species of *Burgundia* of European writer (*Burgundia* cf. *semiclathrata* HAYASAKA from the Astartian of Villereversure, Ain, France) to be true *Circoporella* and not *Burgundia*.

By way it may be pointed out that the Upper Jurassic marine deposits are divisible into three different types according to lithological and fossil contents, namely: 1) Torinosu type composed of shale and sandstone in alternation with lenses of limestone known under the name Torinosu limestone and often richly coralline, 2) Kitakami type of shale and sandstone and lacking limestone, and 3) Hokkaidô type having considerable amount of schalstein with limestone lenses which contains at least *Circoporella* found in the Torinosu type.

# *On a Species of Isogramma (Brachiopoda) from Manchoukuo**

By

**Kotora M. Hatai and Tatuo Omura**

Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, Japan.

(Read and received October 12 th, 1940)

The genus *Isogramma* of the Isogrammidae was first established by F. B. Meek and A. H. Worthen in 1870, based upon *Chonetes millepunctata* Meek and Worthen. The generic diagnosis presented by C. O. Dunbar and G. E. Condra is as follows :

> "Concavo-convex or plano-convex shells of transversely semielliptical outline. The greatest width is a little in front of the hinge-line and the cardinal extremities are normally a little rounded. The width is much greater than the length of the shell. The ventral valve is very gently convex and the dorsal gently concave or plane, the general form of the shell closely resembling that of a large transverse *Chonetes*, with the exception than in *Isogramma* the cardinal areas are obsolete or very narrow.
>
> Internally the ventral valve possesses a narrow but elongate triangular muscle platform. This structure stands a little above the level of the floor of the valve, has abruptly truncated sides and a surface that is nearly flat or depressed toward the mid-line. There is no foramen or deltidium and probably there are no hinge-teeth. The dorsal valve bears a small cardinal process whose base is continued forward as a low, narrow ridge to about the mid-length of the shell. Obscure traces of pallial sinuses radiate from the beak over most of the interior of this valve.
>
> The surface of the shell is marked by fine, sharply elevated, concentric line, separated by broader, flat interspaces. The shell substance is moderately thick. According to Barrois and Paeckelmann, there is an imperforate epidermal layer. The rest of the shell, however, is abundantly perforated with coarse, simple, tubular punctae, which open internally and in the fossil are commonly filld with matrix ".

According to C. O. Dunbar and G. E. Condra, " The name *Isogramma* was first introduced provisionally in 1870, in the following words which are found in a discussion of '*Chonetes? millepunctata* Meek and Hayden' ; 'should it be found, as we beleive it will, to be a new generic type, we would suggest for it the name *Isogramma* (*isos*, equal ; *gramma* a line), in allusion to the remarkable equality of the concentric lines of the surface'. The entire description of '*Chonetes? millepunctata*' was repeated verbatim by Meek and Worthen in 1873 and by some inadvertence, Hall and Clarke (1894, p. 311) dated the genus from the latter year and placed it in the synonymy of *Aulacorhynchus* Dittmar, 1872. However, Dittmar's name was a homonym of *Aulacorhynchus* Gould (1834) applied to a genus of birds, and accordingly Strand, in 1928, proposed a new name *Aulacorhyncha* for the brachiopod genus, while somewhat later in the same year Schuchert and Levene (1929 B, p. 119) revived Meek and Worthen's name *Isogramma*. It appears clear that the latter name was acceptable and Paeckelmann, in 1930 (p. 210), accepted the name *Isogramma* and correctly dated it as of 1870.

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* Transactions of the Palaeontological Society of Japan, No. 117.

Under the circumstances it appears best to reject the name of *Aulacorhynchus* Dittmar, 1872, for this particular type of brachiopod with concentric sculpture, and to use the name of *Isogramma* Meek and Worthen, 1870, as clearly pointed out by C.O. Dunbar and G. E. Condra[1].

The genus *Isogramma*, under the name of *Aulacorhynchus* has been reported by A. W. Grabau and Y. T. Chao[2] from the Carboniferous rocks of China. Their species, *paotechowensis*, which is now refered to the genus *Isogramma*, was reported to occur from the Kuantikou limestone, east of Taiyuan and in the Miaokou limestone at Maoerhkou, west of Taiyuan in Shansi; in the Paotechow limestone at Paotohsien in West Shansi, and also in the Houkou limestone of the Lincheng coal-field in South Chihli. It is also said to be widely distributed in the Taiyuan series of North China.

The wide distribution of this species has lead A. W. Grabau and Y. T. Chao to state that, The species is therefore to be regarded as a characteristic species in the Upper Carboniferous division of the Coal-bearing formation in North China.

*Isogramma davidsoni* (Barrois) and *I. germanica* (Paeckelmann) are known from the Lower Carboniferous, *I. millepunctata* (Meek and Worthen) occurs at various horizons throughout the Pennsylvanian System, "*Chonetes*" *concentricus* De Koninck occurs from the Carboniferous limestone in Scotland, and J. Hall and J. M. Clarke[3] state that, "species of this genus are not common, but appear to be widely distributed in Carboniferous countries, Russia, Silesia, Scotland, and the Asturias." C. O. Dunbar and G. E. Condra say that Dittmar has described three species from the Permian rocks of Russia.

Thus it may be safe to regard the genus as being confined to the Carboniferous and Permian in range.

The specimens dealt with in this article were given to the senior writer for examination by Dr. Motoki Eguchi, formerly of our Institute and now Professor of the Department of Geology, Kitirin College in Manchoukuo. According to him, the specimens were derived from a shale band, hitherto known as being unfossiliferous, at Nisiyama, Honkeiko, Honkei-ken, Hôten province, Manchoukuo. Besides the brachiopod, there were also found several molluscs in association, these will be dealt with in another opportunity. The isogrammid brachiopod is evidently new to science, and to it is given the following description.

### *Isogramma manchoukuoensis*, sp. nov.

Pl. 2 (1), Figs. 5-11.

Shell not large in size, transversely semicircular in outline, nearly twice as broad as high;

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[1] C. O. Dunbar and G. E. Condra: Brachiopoda of the Pennsylvanian System in Nebraska. Nebraska Geol. Surv., Bull. 5, Sec. Ser., pp. 280-284, 1932.

[2] A. W. Grabau and Y. T. Chao: Productidae of China, Part 11, Chonetinae, Productinae, and Richthofeninae. Pal. Sinica, Ser. B, Vol. 5, Fasc. 3, pp. 32-35, 1928.

[3] J. Hall and J. M. Clarke: Introduction to the Study of the Genera of Palaeozoic Brachiopoda. Geol. Surv. State of New York, Palaeontology, Vol. 8, pp. 311-312, 1894.

hinge-ine nearly equal to maximum breadth of shell. Brachial valve flat or but slightly convex, interior with median septum extending from beak to a short distance anteriorly, narrowest posteriorly or at origination broader anteriorly and there abruptly terminating. Surface ornamentation consisting of numerous concentric ridges which are regular, sharply defined, round on top, nearly to their interspaces which are round-bottomed in width ; ridges fewer in posterior region of shell and there are widely separated from each other ; hardly crowded at lateral margins of shell. Microscopic punctations hardly visible.

| | | | | |
|---|---|---|---|---|
| Breadth (in mm.) | 19.0 | 20.0 | 16.2 | ? |
| Height (in mm.) | 9.2 | 10.0 | 7.2 | 8.5 |

This new species is distinguishable from *Isogramma paotechowensis* (Grabau and Chao1)), by the much smaller size of shell, slightly broader concentric ridges on the surface and by the sculpture becoming more simple on the posterior region. *Isogramma millepunctata* (Meek and Worthen2)) is distinguishable from the present species by having a more transversely developed shell with a less straight hinge-line and more pronounced sculpture. *Isogramma concentrica* (De Koninck3)) differs from the present species by the larger shell and stronger concentric ridges on the surface.

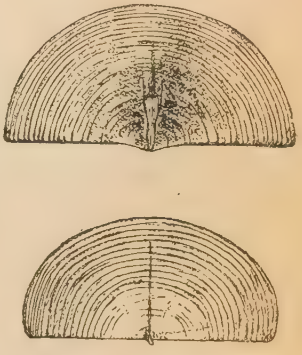

Fig. 1. *Isogramma manchoukuoensis*, sp. nov. (× 2) restored sketch.

Thus, so far as literature is available, the present species can be distinguished from known ones of the genus by the smaller size of the shell and concentric ridges on the surface.

Although the stratigraphic position of the fossil in consideration is not well known to the writers, the box in which the fossils were contained was labeled as "Nisiyama, Honkeiko." This locality is in Honkei-ken, Hôten province, Manchoukuo, and according to M. Noda4), the rocks developed in this district belong to his Penhsi series, which is Carboniferous in age. According to him, the stratigraphy of the Taitzuho district, is as follows, in descending order.

Miyanohara system : Tick sequence of clastic rocks, being characterized by the reddish purple colour. Mesozoic ?

..........unconformity..........

Tsaichia series . Thick alternating beds of gray, greenish and white quartz sandstone and variegated shale. Upper Rotliegendes or later.

Liutang series : Alternating beds of sandstone, shale and coal. Lower Rotliegendes.

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1) A. W. Grabau and Y. T. Chao : Op. cit., p. 33, pl. 1, fig. 27 ; pl. 4, figs. 1–5, 1928.

2) C. O. Dunbar and G. E. Condra : Op. cit., p. 282, pl. 42, figs. 18–21, 1932.

J. Hall and J. M. Clarke : Introduction to the Study of the Genera of Palaeozoic Brachiopoda. Geol. Surv. State of New York, Palaeontology, Vol. 8, p. 311, pl. 83, figs. 14, 15, 1894.

3) T. Davidson : British Fossil Brachiopoda, Vol. 2, Permian and Carboniferous Species. Pal. Soc., p. 278, pl. 55, fig. 13, 1871.

P. V. Semenow : Fauna des schlesischen Kohlenkalkes. Zeit. Deut. geol. Gesell., Bd. 4, p. 345, pl. 5, figs. 1 a–d, 1854.

4) M. Noda : Stratigraphical Studies on the Carboniferous and Permian Formations of Southern Manchoukuo. Bull. Central National Museum of Manchoukuo, No. 7, pp. 7–70, 1939 (Japanese with English résumé).

Huangchi series: Gray shale and sandstone intercalating fossiliferous lenticular limestone. Uralian or Upper Carboniferous.

Penhsi series: Shale, sandstone and lenticular limestone, occasionally with unworkable coal-seams. Moscovian or Middle Carboniferous fusulinids occur.

..........unconformity..........

Middle Ordovician limestone

Since there seems to be no doubt as to the present fossils belong to the Penhsi series of M. NODA, the age is Moscovian or Middle Carboniferous according to fossil evidence produced by M. NODA. This view is upheld by the occurence of molluscan fossils, beside the brachiopod here reported.

In closing this short article, the writers wish to offer their thanks to H. YABE, Prof. Emeritus, Profs. R. AOKI and S. HANZAWA of the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, for kindly looking through and giving the writers permission to publish this manuscript. Acknowledgements are also due to Dr. Motoki EGUCHI of the Department of Geology, Kitirin College in Manchoukuo for kindly donating the specimens to the senior writer for study. Thanks are also due to Mr. KUMAGAI for taking the necessary photographs.

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## Explanation of Plate 2 (1)

Figs. 1, 2. *Isogramma millepunctata* (MEEK and WORTHEN), from the coal measures of Crooked Creek, Illinois. (Reproduced form J. HALL and J. M. CLARKE, 1894.) Fig. 1 is a brachial valve and Fig. 2 is a pedicle valve. (Nat. size)

Fig. 3. *Isogramma concentrica* (DE KONINCK), from the Carboniferous limestone near Clatteringwell quarry, Bishop's Hill, Kenness Wood, Kinross, Scotland. (Reproduced from T. DAVIDSON, 1871.)

Fig. 4. *Isogramma paotechowensis* (GRABAU and CHAO), from the Paote limestone, Paote-Hsien, Shansi, China. (Reproduced from Y. T. CHAO, 1928.)

Figs. 5-11. *Isogramma manchoukuoensis*, sp. nov. ×3. Loc. Nisiyama, Honkeiko, Honkei-ken, Hôten Province, Manchoukuo. (Reg. No. 64401)

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## 滿洲產腕足類 *Isogramma* 屬の 1 種に就て （摘要）

### 畑井小虎・小村達夫

滿洲國高等師範學校江口元起教授は本溪湖產の興味ある腕足類の1種を著者等の1人畑井に送附されたが，同種は明らかに *Isogramma* 屬に入るべきものである。此屬名は 1870 年 MEEK・WORTHEN 兩氏に依り提唱され，從來 DITTMAR 氏の *Aulacorhynchus* の synonym と考へられて居たが，*Aulacorhynchus* なる屬名は既に 1834 年に於て GOULD 氏に依り鳥類の 1 屬に與へられて居た爲，SCHUCHERT・LE VENE 兩氏に依り *Isogramma* なる屬名が復活した。然して今日迄に報告せられた種類數は極めて少く，其等と比較すれば本種は小形なる事其他の相違に依り一見他と區別せらるゝ故，爰に *Isogramma manchoukuoensis* と新たに命名した。

本屬は從來石炭系及二疊系より報告せられ，北支那に於て恐らく上部石炭系のものと考へられて居る。本標品は其產出狀態より推察して，野田光雄學士の所謂 Penhsi series に屬するものと考へられる。

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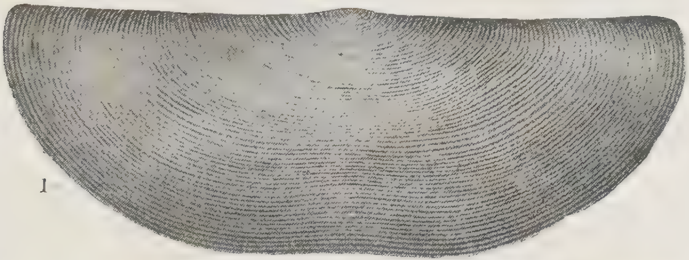

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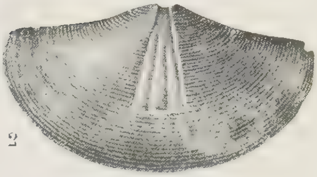

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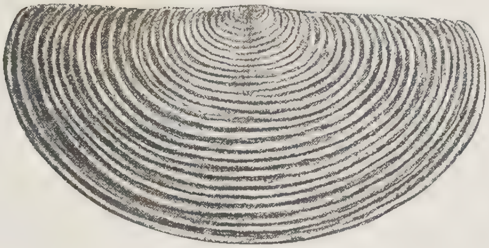

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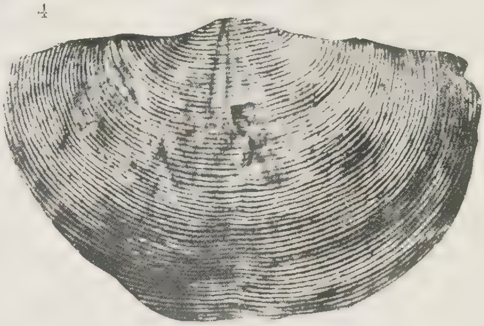

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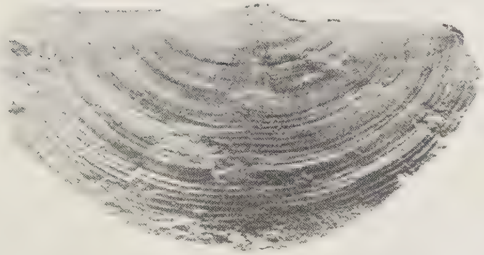

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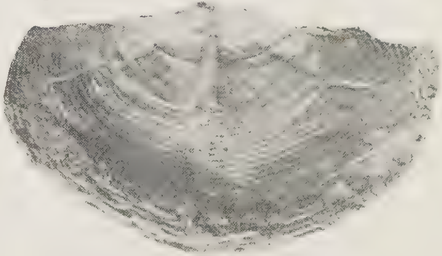

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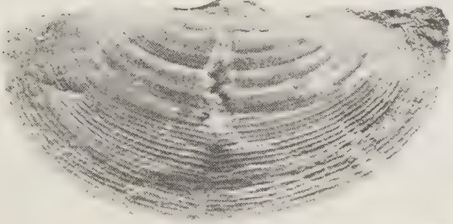

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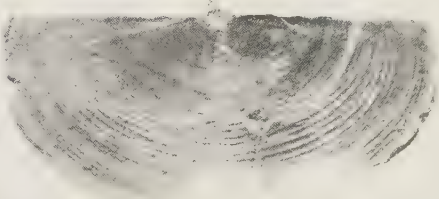

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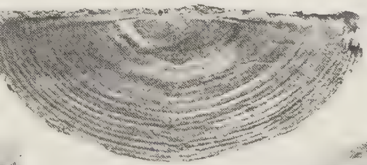

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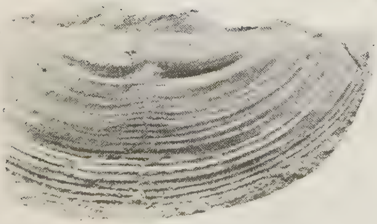

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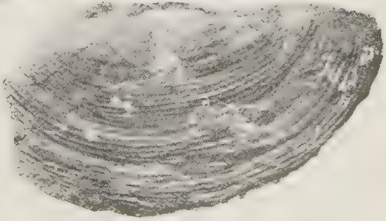


Kumagai photo.

# 山西省太原府東山の1觀察[*,**]

理學博士 大塚彌之助

(昭和15年10月12日講演並に受理)

北支山西省の首都太原は汾河の上流に位し，太原盆地の中央に位してゐる。太原盆地の西側及び東側は中性の山地で境されてゐる。こゝに述べる東山地域は太原府の東々北 10 km 附近の山地の總稱であるが，この地域からは石炭・鐵鑛床等を產し，太原府を中心とした1つの重要な鑛產資源の分布區域に當つてゐる。

筆者は幸，東亞研究所の御援助の下にこの東山地域を觀察する機を得た。こゝに述べるのはその時得た筆者の1觀察に過ぎないが，こゝに記して同學の御參考に資さうと思ふのである。

筆者は僅に太原府より北方に向ひ中澗河から蘆家灣に至り牛駝村・瓜地溝に至り戾つたのであるが，その間の觀察は極めて興味深いものがあつた(第5圖地質圖參照)。

太原府から中澗河に至る間は主として再積黃土の堆積面からなつてゐる。

中澗河部落から蘆家灣に至る間には黃土 (l) が露出し，河崖には美しい垂直な節理狀の裂罅を示してゐる。

蘆家灣から東へ約 1 km 程の間は黃土層の下部に不整合に粗砂礫の地層をみることができる。この砂礫層から何等化石を見出し得なかつたが，之は恐らく上部鮮新統 (pd) の三門統砂礫層と言ふべきものであらう。この砂礫層は傾斜した薄小豆色の砂岩からなる地質系統を不整合に被ふてゐる。

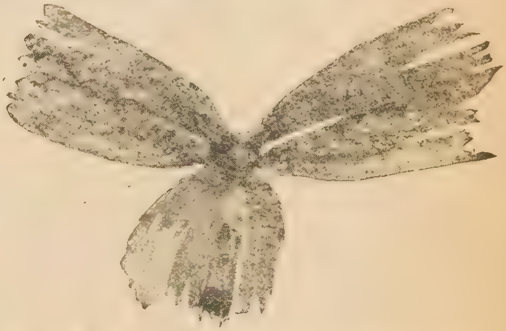
この砂礫層を最後にして，之から東部に東山山地が發達してゐる。即ち太原盆地はこの三門統砂礫層堆積當時から堆積區として東山から削剝された碎屑物を堆積してゐた區域であつたことを知る。即ちこの砂礫層から上部は全く盆地堆積物であり，東山は基盤岩石からなつてゐる譯である。

### 基盤岩石

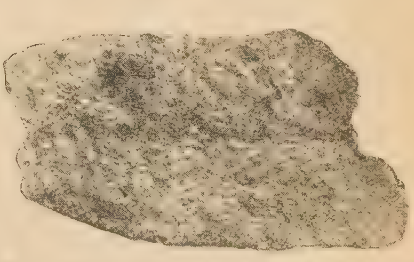
上記三門統砂礫層下に不整合に橫はる砂岩層は薄小豆色或は淡赤紫色を呈した砂岩で層向略ぼ東西或は北 60° 西に走り，傾斜南へ 12°～18° 位である。この桃色或は淡赤紫色砂岩層の下部は次第に赤味を減じ褐色，淡褐色の砂岩となり，粒子はかなり粗となる。

筆者は暫く此の路を東々北へ向つて進んで行つたので，この淡赤紫色砂岩 (trp) から順次淡褐色の砂岩 (cp) に移過する狀を觀察し得た。

牛駝村の南の澤底には1つの背斜構造をみる。背斜軸の走向は N 60°W，この北翼は次第に傾斜を緩め，1斷層を經て再び西北へ傾斜するに至る。この背斜軸附近は珪質砂岩よりなる。この粗粒淡



第1圖 *Sphenophyllum oblongifolium* (GERMAR and KAULFUSS).



第2圖 *Neuropteris* sp. a of HALLE (長さ 16 mm).

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[*] Transactions of the Palaeontological Society of Japan, No. 118.

[**] The 4th Report on the Results of Geol. Studies in North China and Southern Mongolia, 1939.

褐色砂岩は次に粒形を増し，所々に薄く泥岩層を挟み粗悪な植物化石破片を含み，稀には泥灰岩質結節を含んでゐる。

この淡褐色の砂岩層の下位には植物化石を含んだ暗灰色の頁岩又は泥岩層横はり，之は粗粒の花崗岩質砂岩又は細粒白色の珪質礫岩よりなる。地層の上に横はつてゐる植物化石破片には次の様なものが見られた。

*Sphenophyllum oblongifolium* (GERMAR and KAULFUSS) [Palaeontologia Sinica, Ser. A, Vol. 11, fasc. 1, pp. 40-41, pl. 8, figs. 11-17.] (第 1 圖)

*Neuropteris* sp. a of HALLE [Palaeontologia Sinica, Ser. A, Vol. 11, fasc. 1, pp. 124-125, pl. 27, figs. 16-18.] (第 2 圖)。

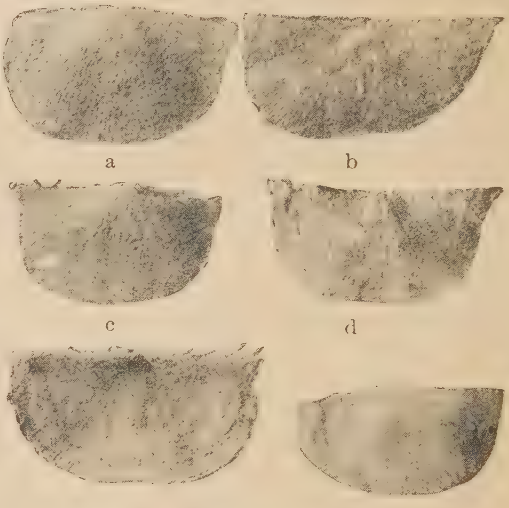
本化石層はそれに含まれる植物化石及び岩相上の特長から當地方によく發達する二疊，石炭系(cp)（山西統又は下部石盒子統）に該當するものと考へられる。

この粗粒砂岩層の下位には薄き石灰岩介在し，次の石炭層を介在する。

牛駝村の南方には銀山炭坑と稱する1炭坑があり，地表下 90 m 附近より石炭を採掘してゐるが，上記石炭層は略ぼこの鑛山の石炭層に該當するらしい。

この下位は黑色の石灰質頁岩層となる。本層は屢々赤鐵鑛のレンズ狀結節を含み，次の腕足類化石をも含むを特長とする。即ち

*Chonetes carbonifera* KEYSERLING (第 3 圖 a〜f)。



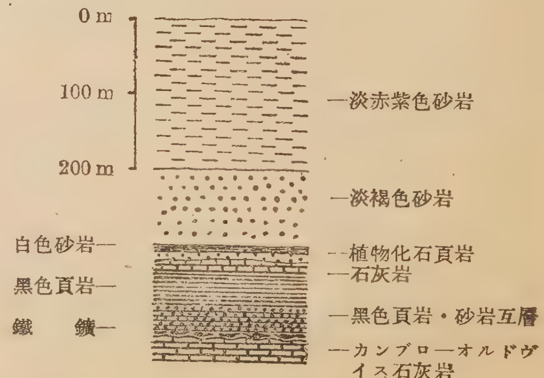
第 3 圖　*Chonetes carbonifera* KEYSERLING ×2.

1899 *Chonetes pseudovariolata* NIKITINS

[LOCZY: Wiss. Ergebn. Reise des Grafen Bela Széchenyi in Ostasien, Bd. III, pp. 73-76, figs. 12 a〜12 e, pl. 3, figs. 8-13.]

1903 *Chonetes carbonifera* KEYSERLING

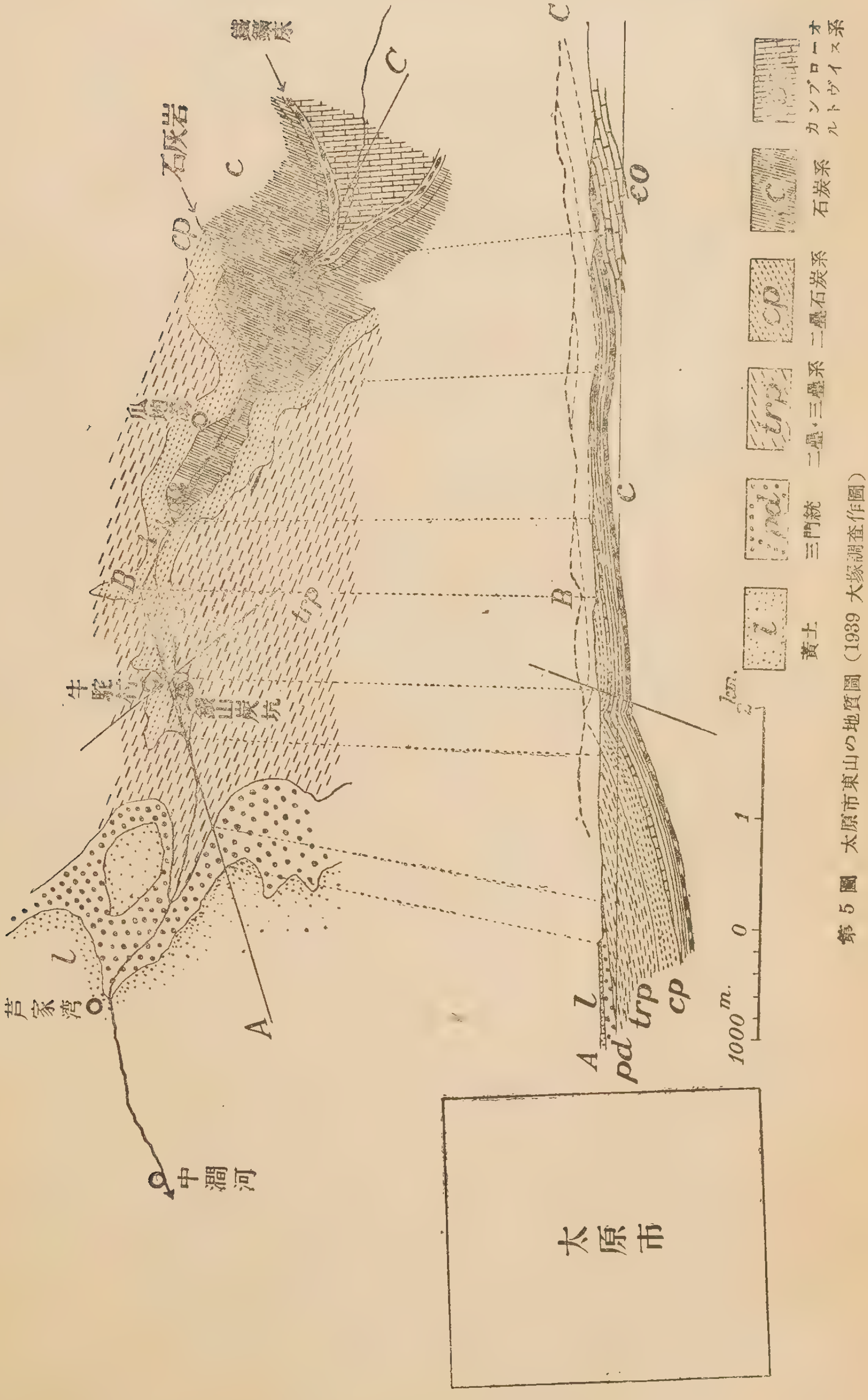
[CHAO: Palaeontologia Sinica, Ser. B, Vol. 5, fasc. 3, pp. 13-16, pl. 1, fig. 19-22; pl, 3. figs. 6-14; pl. 4, fig 6.]



第 4 圖

この化石は CHAO（趙）氏が *Spirifer mosquensis* 帶中の特長と考へたものの1つである。即ち Moscovian 階（中部石炭系）と考へられる。化石はこの黑色頁岩中に殼表が雌型として印されてゐる。

この黑色頁岩層は厚さ約 60 m で，次に黑色頁岩，灰色の薄い砂岩との厚さ約 20 m の互層が横はり，最下に赤鐵鑛團塊を多量に含む基底礫岩が横はり，之はカンブローオルドヴイス系の赤色石灰岩上に平行不整合に横はつてゐる。こ



第5圖 太原市東山の地質圖（1939 大塚調査作圖）

の地方の鐵鑛は主としてこの基底礫岩中の團塊及び上述した黑色頁岩中にレンズ狀に介在する團塊を採取するものである。

上述したことを更に柱狀斷面圖にして示すと第4圖の如くになり，白色の粗粒砂岩迄は二疊・石炭系以上と見做し得べく，白色の粗粒砂岩及びその上位の含植物化石層は少くとも二疊・石炭系山西統と見做し得る。而して白色砂岩以下の地層は *Chonetes carbonifera* を含み，太原統の下部即ち中部石炭系を示すものの樣だ。

太原西山山地及び石盒子溪谷に於いて Norin 等が觀察した層序に比して，腕足類を含む石灰岩等が稍々缺除してゐる樣に見えるのは興味ある點である。

杜撰なる1觀察に過ぎないが野帳に隱しておくのも本意ないのでこゝに記して諸兄の御參考に資さう。終りに臨み，深く太原梅津部隊の御好意を謝す。

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## Stratigraphic Observations at the Eastern Hill of Taiyuan-fu, in the Shansi District, North China.

(Résumé)

Yanosuke Otuka

In this short paper, the writer describes the results of his stratigraphic observations in 1939 in North China. The Eastern Hill of Taiyuan-fu in the Shansi district stratigraphically consists, in descending order, of the redeposited loess, the loess (the Malan stage), the sand and gravel formation (the Sanmenian stage), the purple or reddish chocholate sandstone (the Permo-Triassic), the light brown sandstone, the *Neuropteris*-bearing shale (the Permo-Carboniferous), the limestone, the *Chonetes carbonifera*-bearing black shale (Middle Carboniferous), the alternation of black shale and sandstone, the basal conglomerate with iron nodules, and the Cambro-Ordovician limestone.

As may be seen from a comparison of the stratigraphic columns established by Norin and other authors in the Western Hill of Taiyuan-fu and the Shihhotze valley with the writer's, it is likely that some Permian and Carboniferous stratigraphic facies in the former lack in the latter.

# *Tertiary Foraminifera from the Koguti Formation and the Ôsawa Limestone in the Niitu Oil Field, Niigata Prefecture*[*]

By

**Tuneteru OINOMIKADO**

(Read February 24th; received October 20th, 1940)

Material from two localities was examined for the Foraminifera. One of them is fine sand of the Koguti Formation exposed near Kanatu, Kanatu-mura, Nakakanbara-gun, the other is loose fine sand lense in the impure limestone at Ôsawa, Ôkanbara-mura, Nakakanbara-gun. The Foraminifera fauna of the two localities is relatively poor in number of species, but rich in number of individuals. The total number of the species now distinguished amounts to 48; of them 32 are found at Kanatu; 34, including 1 new species, at Ôsawa.

The determined species are as follows:

Table 1.

| | Kanatu Lor. 46 | Ôsawa Lor. 47 |
|---|---|---|
| Valvulinidae | | |
| 1. *Karreriella baccata japonica* ASANO | R | R |
| Miliolidae | | |
| 2. *Cribrolinoides curta* (CUSHMAN) | — | R |
| 3. *Quinqueloculina vulgaris* d'ORBIGNY | R | R |
| Nodosariidae | | |
| 4. *Glandulina laevigata* (d'ORBIGNY) | C | R |
| 5. *Oolina laevigata* (REUSS) | R | — |
| 6. *Oolina laevigata acuta* REUSS | — | C |
| 7. *Oolina marginata* (WALKER and BOYS) | R | — |
| 8. *Dentalina communis* d'ORBIGNY | R | — |
| 9. *Dentalina setanaensis* ASANO | C | R |
| 10. *Lagena acuticostata* REUSS | R | R |
| 11. *Lagena gracillima* SEGUENZA | R | — |
| 12. *Lagena hexagona* (WILLIAMSON) | R | R |
| 13. *Lagena* sp. 3 | — | R |
| 14. *Lagena* sp. 6 | R | — |
| 15. *Fissurina fasciata* (EGGER) | — | R |
| 16. *Fissurina orbignyana* (SEGUENZA) | R | — |
| Polymorphinidae | | |
| 17. *Guttulina irregularis nipponensis* CUSHMAN and OZAWA | — | R |
| 18. *Guttulina kishinouyi* CUSHMAN and OZAWA | — | R |
| 19. *Guttulina yabei* CUSHMAN and OZAWA | — | R |
| 20. *Guttlina* sp. | R | — |
| 21. *Sigmomorphina sawanensis* (CUSHMAN and OZAWA) | R | — |

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[*] Transactions of the Palaeontological Society of Japan, No. 119.

| | | |
|---|---|---|
| 22. *Sigmomorphina yokoyamai* CUSHMAN and OZAWA | -- | R |
| 23. *Sigmomorphina* aff. *nagaoi* ASANO | R | — |
| 24. *Sigmomorphina* sp. | R | --- |
| Nonionidae | | |
| 25. *Nonion pompilioides etigoense* ASANO | A | C |
| 26. *Nonion subturgidum* (CUSHMAN) | R | R |
| 27. *Elphidium crispum* (LINNÉ) | R | A |
| 28. *Elphidium subgranulosum* ASANO | C | R |
| Bulimindae | | |
| 29. *Bulimina pyrula* d'ORBIGNY | C | -- |
| 30. *Loxostoma etigoense* OINOMIKADO n. sp. | — | R |
| 31. *Uvigerina* cf. *bifurcata* d'ORBIGNY of ASANO | A | A |
| 32. *Angulogerina angulosa* (WILLIAMSON) | A | A |
| 33. *Angulogerina selesyensis* (HERON-ALLEN and EARLAND) | R | |
| Rotaliidae | | |
| 34. *Discorbis vilardeveana* (d'ORBIGNY) | -- | R |
| 35. *Discorbis* sp. | — | R |
| 36. *Eponides tenerus* (BRADY) | R | -- |
| 37. *Eponides* aff. *culter* (PARKER and JONES) | C | R |
| Cassidulinidae | | |
| 38. *Cassidulina japonica* ASANO and NAKAMURA | VA | VA |
| 39. *Cassidulina subgrobosa* BRADY | -- | R |
| 40. *Cassidulina sublimbata* ASANO and NAKAMURA | — | R |
| 41. *Cassidulina yabei* ASANO and NAKAMURA | A | C |
| Globigerinidae | | |
| 42. *Globigerina bulloides* d'ORBIGNY | C | A |
| 43. *Globigerina* sp. 3 | R | -- |
| 44. *Globigerina* sp. 4 | A | A |
| Anomalinidae | | |
| 45. *Planulina wuellerstorfi* (SCHWAGER) | — | R |
| 46. *Cibicides pseudoungerianus* (CUSHMAN) | R | R |
| 47. *Cibicides refulgens* (MONTFORT) | — | A |
| 48. *Cibicides ungerianus* (d'ORBIGNY) | -- | R |

(VA=Very abundant; A=Abundant; C=Common; R=Rare)

As seen in the above list, the fossil fauna of Kanatu bears a close affinity with that of Ôsawa. In both localities, the Foraminifera fauna, which I will call Ôsawa assemblage, is characterized by very prolific individuals of *Cassidulina japonica*.

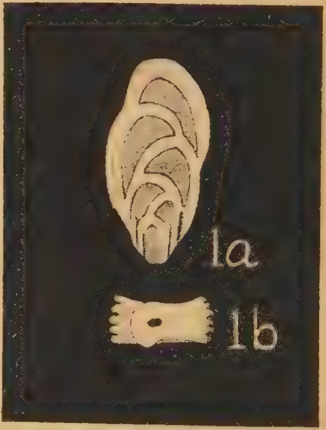
## Description of New Species

### *Loxostoma etigoense* OINOMIKADO n. sp.

Figs. 1a, b.

Holotype: Preserved in the Imperial Geological Survey of Japan.

Test oval, compressed, about twice as long as broad, greatest breadth at about the middle, apical end round-pointed, apertural end broadly rounded, periphery in end view broadly rounded,



Figs. 1a, b. *Loxostoma etigoense* OINOMIKADO n. sp. ×40. Holotype. a: front view; b: apertural view.

almost truncate, sculptured with longitudinal costae; chambers comparatively few, increasing rapidly in height and size as added, running back obliquely on the outer border; sutures distinct, limbate; wall ornamented with a few longitudinal costae; aperture terminal, broadly elliptical.

Dimentions: Holotype, Length 0.68 mm., Breadth 0.33 mm., Thickness 0.16 mm.

This peculiar, quadrate form is easily distinguished from any other species. In front view this species resembles somewhat *Loxostoma amygdalaeforme* (BRADY), but differs from the latter by its truncated periphery, more distinct and limbate sutures, and few costae on the surface.

Type locality: In a loose fine sand lense in the impure limestone at Ôsawa quarry, Ôkanbara-mura, Nakakanbara-gun, Niigata-ken (Pliocene).

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## 新潟縣新津油田小口層及び大澤石産第三紀有孔蟲 (摘要)

大炊御門 經 輝

此處に報告した有孔蟲化石の産地は新潟縣中蒲原郡金津村金津と同縣同郡大蒲原村大澤の 2 ヶ所で, 前者は大村一藏學士の小口層に屬し, 後者は遠藤六郎學士の第三系中部統皆川層で其の位置は同氏の調査に依る大日本帝國油田第 37 區新潟縣新津油田南部地形及地質圖 (昭和 14 年) に示されてゐる。金津から 32 種, 大澤から 34 種を鑑別した。其の中 *Loxostoma* の 1 新種が含まれてゐる。兩産地の有孔蟲群は互によく類似し, 特に優勢種が共通であるので此の兩産地は略々同一層準にあるものと思はれる。

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# 赤坂・醒ケ井地方產 *Pseudoschwagerina* 並に *Pseudoschwagerina* 帶の地質時代の考察*1)

理學博士　藤　本　治　義

(昭和 15 年 2 月 24 日講演, 10 月 31 日受理)

## 1. 緒　　言

岐阜縣不破郡赤坂地方から滋賀縣坂田郡醒ケ井地方に亘る區域は秩父古生層の良く發達した地域として知られてゐる。筆者は昭和 14 年の秋是等の地方の秩父系の層序の概略を觀察する機會を得た。其の際次の 3 ケ所 (1) 岐阜縣不破郡赤坂金生山, (2) 滋賀縣坂田郡東黑田村萬願寺, (3) 滋賀縣坂田郡醒ケ井村下丹生より *Pseudoschwagerina* を採集することが出來た。此の化石は紡錘蟲の中でも垂直的分布が極く限られ, 標準化石として著しい種類であるので, 此處にこの化石に關する研究の結果を報告し, 併せて *Pseudoschwagerina* 帶の地質時代に關する愚見を述べて大方の御叱正を仰ぐことにした。

## 2. 金生山の *Pseudoschwagerina*

金生山より採集したものは種類が *Pseudoschwagerina schellwieni* (YABE) HANZAWA で, 之に *Schwagerina vulgaris* (SCHELLWIEN), *Schwagerina* sp., *Fusulina* sp. を伴つてゐる。標本は有名な金生山石灰岩の南側の石切場の轉石中より採集したもので, 正確な產地が不明である。母岩は暗灰色の石灰岩であつて, その隨伴する化石の種類等によつて判斷する時は金生山の石灰岩の小澤儀明2)博士による Benizima 帶或は夫より下位の地層 (小澤氏の論文ではこの部分を缺いてゐるが) より產したものと推定される。小澤博士は赤坂石灰岩の最下部層である Benizima 帶は *Schwagerina granum-avenae*, *Schwagerina ambigua* を產して *Pseudoschwagerina* を產しないことから *Pseudoschwagerina* 帶 (從來の *Schwagerina princeps* zone) の上の層位にあるもので, 其の地質時代は下部二疊紀又は二疊石炭紀であるとした。併し此度の發見によつて考察すると赤坂の石灰岩の下部には *Pseudoschwagerina* 帶のあることが明である。多分 Benizima 帶又は其の下位の地層が *Pseudoschwagerina* 帶に相當するものであらう。

## 3. 萬願寺の *Pseudoschwagerina*

この標本は坂田郡東黑田村萬願寺 (東海道線近江長岡驛の東側) の石灰岩採石場より產したものであつて, 種類は *Pseudoschwagerina schellwieni* (YABE) HANZAWA で, 保存の良い標本である。此處に發達する石灰岩は灰白色で塊狀の岩石である。*Pseudoschwagerina* に隨伴する有孔蟲は他にも有るのであるが, 未調査であるため此處に報告し難い。當地方の秩父系の層序•化石等に就いては

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* Transactions of the Palaeontological Society of Japan, No. 120.

1) 本研究は文部省科學研究補助による. 此處に當局に對し厚く謝意を表する. 尙本稿は昭和 15 年 2 月 24 日開催の日本古生物學會例會に於いて發表したものに多少の增補をなしたものである.

2) Y. OZAWA: Stratigraphical Studies of the Fusulina Limestone of Akasaka. Jour. Fac. Sci. Imp. Univ. Tokyo, Sec. 11, Vol. 11, Pt. 3, 1927.

小澤儀明: 赤坂石灰岩の研究, 地學雜誌, 第 39 卷, 460 號, 昭和 2 年.

竹山俊雄[1]・關武夫[2]兩學士の研究がある。關武夫[2]學士の報文によると同産地から *Schwagerina kraffti* (SCHELLWIEN) が報告されてゐる。この *Pseudoschwagerina* の層位は關武夫學士の研究によると醒ケ井層に含まれるものであつて，同氏が *Pseudoschwagerina* 及び *Paraschwagerina* 帶とされてゐるものに相當する。尚同氏によるとこの醒ケ井層の主要な紡錘蟲化石には *Paraschwagerina oblonga* (OZAWA), *Schwagerina* n. sp. (*S. kraffti* group), *Pseudoschwagerina* sp., *Schwagerina vulgaris* (SCHELLWIEN), *Schwagerina anderssoni* (SCHELLWIEN), *Doliolina aliciae* DEPRAT が擧げられ，醒ケ井層の地質時代に就いてはその上位に來る大野木層と共にロシヤの Sakmarian 階及び北米の Wolfcampian 階に相當するものであると述べてゐる。

## 4. 下丹生の *Pseudoschwagerina*

この標本は坂田郡醒ケ井村下丹生部落中央部に於いて，部落を南より北方へ流出する谷川の河床に露出する泥灰質の石灰岩より採集したもので，種類は上記のものに似てゐるが，大きさ，antetheca の狀況等に於いて既知の種と多少差別があつて，區別され，*Pseudoschwagerina samegaiensis* sp. nov. である。母岩には層理が良く發達し，走向略東西で北方へ約 40 度傾斜してゐる。この附近の秩父系については瀧本清[3]學士の研究がある。同氏の研究によるとこの化石層の層位は靈仙層の中部（ロ）輝綠凝灰岩を主とする地層に含まれるものである。同氏はこの地層から *Schwagerina vulgaris* (SCHELLWIEN), *S. vulgaris* var. *globosa* SCHELLWIEN, *S. prisca* (DEPRAT), *S. satoi* (OZAWA), *S. prisca* var. *parvula* (SCHELLWIEN), *S. richthofeni* (SCHWAGER), *Mizzia velebitana* SCHUBERT の産出することを報告し，その地質時代に就いては其の下位に重る（イ）粘板岩・角岩を主とする地層と共に Uralian に相當すると述べてゐる。

## 5. 3 化石床の對比

*Pseudoschwagerina* 屬は *Paraschwagerina* 屬と共に一般に垂直的分布が限られてゐて，ロシアでは Sakmarian[4] 又北米大陸では Wolfcampian 階[5]の標準化石として重要視されてゐる。

本邦でも從來所々に其の産出が知られてゐたのであるが，最近半澤正四郎[6]博士がこの屬の其の層位學的の重要性を强調され，2 新種を報告すると共に之等の *Pseudoschwagerina* を産する化石帶は何れも Sakmarian に相當するものなることを述べられてゐる。

以上の次第で[7]此の度 *Pseudoschwagerina* を發見した 3 産地の層位は相互に略同層位に來るものであつて，歐米の Sakmarian 又は Wolfcampian に對比し得るものであると考へられる。

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1) 竹山俊雄：伊吹山醒ケ井附近の古生層，地球，第 20 卷，第 5 號，昭和 8 年 (1933).

2) 關　武夫：伊吹山附近秩父系の層序及び構造に就いて，矢部教授還暦記念論文集，昭和 14 年 (1939).

〃　：伊吹山及びその附近の紡錘蟲石灰岩の化石に就いて，日本古生物學會報告，地質學雜誌，第 45 卷，536 號，昭和 13 年 (1938).

3) 瀧本　清：滋賀縣犬上郡靈仙山附近の地質構造，地球，第 26 卷，第 1 號，昭和 11 年 (1936).

4) M. K. ELIAS: Carboniferous and Permian of the Southern Urals. Amer. Journ. Scie. Vol. XXXIII, No. 196, pp. 279-295, 1927.

5) J. W. BEEDE and H. T. KNIKER: Species of the Genus *Schwagerina* and their Stratigraphic Significance. Univ. Texas Bull., No. 2433, pp. 5-79, 1924.

6) S. HANZAWA: Stratigraphical Distributions of the Genera *Pseudoschwagerina* and *Paraschwagerina* in Japan etc. Jap. Journ. Geo. Geogr., Vol. XVI, Nos. 1-2, 1938.

7) 朝鮮では波多江學士 (1939) の研究によると *Pseudoschwagerina glomerosa* の帶は必ずしも限られないといひ，又支那では陳旭 (1934) によると船山 (Chuanshan) 石灰岩に最も多くて棲霞 (Chihsia) 石灰岩に缺き，その上の茅口 (Moskou) 石灰岩に再び現れるといふ事實があつて，結果が必ずしも一致しないが大體に於いては認めてよいものであらう.

## 6. *Pseudoschwagerina* zone の地質時代に就いて

從來 *Schwagerina princeps* E. と稱された種類を中心とする *Pseudoschwagerina* の屬は標準化石として重要視され，古くは Uralian (上部石炭系) の上部即ち *Schwagerina* 階[1] (*Schwagerina princeps* Eherenberg の帶である) の標準化石とされてゐたものであつたが，其後此の屬は北米大陸では J. W. Beede・R. H. T. Kniker[2] 始め多數の學者[3]の研究によつて Wolfcampian 階又ヨーロツパ・ロシヤでは M. K. Elias[4]・C. O. Dunbar[3] の報告によると Sakmarian 階の標準化石であることが指摘され，其の地質時代を二疊系の下部又は最下部と考へられて來た。即石炭系と二疊系との境界が從來より一段下げることになつたのである。斯樣な次第であるので此處にヨーロツパ・ロシア及び北米に於ける石炭系の中部上部及び二疊系の最近の研究結果を摘記したい。

ロシアのウラル地方は石炭系の中部及び上部並に二疊系の海成層の標式的產地として昔から有名な地方であるが，この南部ウラル地方に發達するこの地層を最近 Ružencev の調査した結果を M. K. Elias[4] が報告してゐる。

之によると層序と其の化石種の概要は次の樣である (上位より順に下位へ)。

Kungurian (中部二疊系) 層厚 225-400 m，頁岩・砂岩・石灰岩より成り，紡錘蟲を含まない。

Artinskian (下部二疊系) 層厚 1200-1250 m，砂岩・頁岩・礫岩より成る。多數の Ammonite を產するが，紡錘蟲は少く，只 *Pseudofusulina* aff. *lutugini* Schellw. のみ多數に含む。

Sakmarian (最下部二疊系) 層厚 1200 m，砂岩・石灰岩等より成る，化石には Ammonite 紡錘蟲が多く少數の腕足類を產する。次の種類がある。*Parapronorites* sp., *Artinskia* n. sp., *Agathiceras frechi* Böse, *Gastrioceras subhanieli* Ruž., *Schwagerina fusiformis* Krot., *S.* aff. *kansasensis* Beede et Kniker, *Pseudofusulina verneili* Möll., *P. tscherhyschewi* Schellw., *P. alpina* Schellw., *Quasifusulina longissima* Möll., *Pseudoschwagerina princeps* Ehr., *P.* aff *moungthensis* Depr., *Staffella sphaerica* Abich., *Pseudofusulina prisca* Möll., *P. krotowi* Schellw., *P. uralica* Krot.

Uralian (上部石炭系) 層厚 1100 m，砂岩及び石灰岩を伴ふ粘土より成る。化石は上部に *Shumardites* cf. *simondsi* Smith, *Glaphirites* n. sp., *Gastrioceras* n. sp., *Agathiceras frechi* Böse, *Parapronorites* n. sp., *Triticites beedei* Dunbar and Skinner, *T. plummeri* Dunbar and Condra, *Pseudofusulina stabilis* Rauser, *Schwagerina fusulinoides* Schellwien, 下部に *Tritieites simplex* Schellw., *T. montiparus* Ehr. and Möll., *T. incisus* Schellw., *T. ventricosus* Schellw., *Quasifusulina-longissima* Möll., *Fusulinella usvae* Dutke.

Moscovian (中部石炭系) 層厚 1000-1500 m，砂質粘土・綠灰色砂岩・石灰岩等より成る。化石には *Gastrioceras martini* Schmidt., *G.* cf. *rurae* Schmidt., *G.* cf. *listeri* Mart., *Reticuloceras* cf. *superbilingue* Bisat., *Marginifera loezii* Chao, *Bothrophyllum pseudoconicum* Dobr., *Meniscophyllum* aff. *kausuense* Grabau 及び中部石炭紀型の紡錘蟲が多い。

下部石炭系 層厚 1550 m，暗色の珪質頁岩及び石灰岩より成る。化石には紡錘蟲なく，*Homoceras*, *Glyphioceras*, *Agonides*, *Proshumardites* 等の Ammonite 及び *Productus striatus* Fish., *Marginifera* aff.

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1) Schellwien: Die Fusulinen des russisch-arktischen Meeresgebietes. Palaeontographica, Bd. 56, 1908, 其他.

2) J. W. Beede and H. T. Kniker: 前出, 1924.

3) C. O. Dunbar: The Type Permian, Its Classification and Correation. Bull. Amer. Assoc. Petr. Geologists, Vol. 24, No. 2, Feb., 1940.

R. C. Moore: Carboniferous Permian Boundary. Bull. Amer. Assoc. Petr. Geologists, Vol. 24, No. 2, Feb., 1940.

4) M. K. Elias: 前出, 1937.

*viseeniana* CHAO, *Squamularia lineata* MART., *Rhipidomella pecosi* MARC., *Schizophoria respirata* MART., *Lonsdaleia floriformis* MART., *Zaphrentis* cf. *enniskilleni* EDW. and HAIME 等を含む。

この結果によつて見ると從來 Uralian とされてゐた地層の上部の *Pseudoschwagerina* を産する部分を Sakmarian と新しく命名して區別し，從來の Uralian から分離したことに成つてゐる。而して Sakmarian の地質時代は二疊系の最下部としてゐる。この Sakmarian は從來の *Pseudoschwagerina* 帯に相當するものである。上述の Sakmarian 統の新提唱並にこの統の下底に二疊系と石炭系の境界を置くとする說はロンデの學界では反對者がないのではないが，多くの學者に贊成され，又北米合衆國の學者には贊成者が多い様である。最近 C. O. DUNBAR[1] は文献上の研究と 1937 年に於ける萬國地質學會の見學旅行に於ける見學調査に基付いてロシアの二疊系・石炭系の層序を論じてゐる。之によるとこの地方の層序並に化石帯は凡そ次の通りである。

| | |
|---|---|
| Tartarian 統<br>Kazanian 統<br>Kungurian 統 | 紡錘蟲を産せず |
| Artinskian 統 | *Schwagerina lutugini* 帯<br>*S. andersoni* 帯<br>*S. molleri* 帯 |
| Sakmarian 統 | *Pseudoschwagerina* 帯 |
| Upper Carboniferous 統 | *Triticites* 帯 |
| Moscovian 統 | *Fusulinella* 帯 |

DUNBAR は RUŽENCEV の Uralian とした *Triticites* の特に多い帯は Upper Carboniferous とし，又 Uralian の語は始め DE LAPPARENT によつて使用されたものであるが今日ではその意義が不明瞭で今後の精査の完成するまではこの語の使用を避けるべきことを述べてゐる。

北米大陸に於いても紡錘蟲化石を含む石炭系・二疊系の研究が盛んである M. P. WHITE[2]・C. O. DUNBAR[3]・G. E. CONDRA・J. W. SKINNER[4]・R. C. MOORE[5] 等の諸氏の之までの研究を綜合すると次の様である。(Texas 及び Iowa 地方を中心としたもの。)

| | | | |
|---|---|---|---|
| Permian | Capitan formation | *Polydiexodina* 帯 | *Polydiexodina*, *Codonofusiella*, *Leella* 等の著しく specialized した紡錘蟲が多い。 |
| | Word formation<br>Leonard formation | *Parafusulina* 帯 | *Porafusulina*, が最も多く *Pseudoschwagerina* 帯に多い屬がない。 |
| | Wolfcampian | *Pseudoschwagerina* 帯 | *Pseudoschwagerina*, *Paraschwagerina*, *Schwagerina*, *Triticites* の種類が多い。 |
| Pensylvanian | Virgil Series | *Triticites* 帯 | *Triticites* 及び *Fusulina* を少數に含む。 |
| | Missouri Series | *Triticites* 帯 | *Triticites* 最も多く *Wedekindellina* も含む。 |
| | Des Moines Series | *Fusulina* 帯 | *Fusulina*, *Fusulinella*, *Wedekindellina*, *Staffella* が多い。 |

本邦でも半澤博士は最近本邦の *Pseudoschwagerira* 帯の地質時代を検討されて BEEDE・KNIKER・

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1) C. O. DUNBAR: 前出 1940.

2) M. P. WHITE: Some Texas Fusulinidae. The University of Texas Bulletin, No. 3211. 1932.

3) C. O. DUNBAR et G. E. CONDRA: The Fusulinidae of the Pensylvanian System in Nebraska. Nebraska Geological Survey Bullet., II, Sec. Ser., 1927.

4) C. O. DUNBAR et J. W. SKINNER: Permian Fusulinidae of Texas. The Geology of Texas, Vol. III, Pt. 2, 1937.
C. O. DUNBAR: 前出, 1940.

5) R. C. MOORE: 前出, 1940.

Elias の諸氏の研究に傚つて本邦の *Pseudoschwagerina* 帶を Sakmarian 階に對比されてゐる。又從來本邦並に東亞大陸に於いて *Pseudoschwagerina* 其他の化石の產出によつて Uralian とし石炭系上部とされてゐた地層を何れも Sakmarian 階と考へてゐる樣である。尙同樣な意見は Grabau1) によつて述べられてゐるのであつて，同氏は東亞の Uralian を二疊系下部と考へてゐる。

本邦に於いて之まで Uralian としてゐた地層に *Pseudoschwagerina* を含むことは Sakmarian 及び Wolfcampian に於ける場合と良く一致するのであるが，*Pseudoschwagerina* 以外の紡錘蟲を見るときは *Triticites* を含むことが少くなく，新しい意義に於ける Uralian 及び Pensylvanian の fauna を多分に混じてゐることは否定出來ないと思ふ。卽本邦に於いては Sakmarian fauna と狹義の Uralian fauna が混在してゐると思考されるのである。今本邦に於いて之まで *Pseudoschwagerina* 帶或は Uralian としてゐた地層の紡錘蟲の種屬の組合せを上述の Ural 地方及び北米大陸に於ける層序に於ける夫と比較して見る。

例へば山口縣秋吉臺秩父系の小澤博士2) の研究について見ると，同氏が *Pseudoschwagerina* 帶 (=*Schwagerina* 帶) とし，Uralian と考へた地層からは次の紡錘蟲を報告されてゐる。

*Pseudoschwagerina (Schwagerina) moungthensis* subzone $C_3^1$

1. *Pseudoschwagerina (Schwagerina) moungthensis* Deprat
2. *Triticites incisus* (=*F. incisa*) (Schellwien)
3. *Schwagerina (F.) kattaensis* Schwager
4. *S. (F.) prisca* Möller
5. *S. (F.) prisca* var. *parrala* Schellwien

*Pseudoschwagerina (Schwagerina) princeps* subzone $C_3^2$

6. *Pseudoschwagerina (Schwagerina) princeps* (Ehrenberg)
7. *Schwagerina (Fusulina) vulgaris* Schellwien
8. *Triticites montiparus* (=*F. montipara*) (Möller)
9. *S. (F.) richthofeni* Schwager
10. *S. (F.) prisca* Möller
11. *S. (F.) secalis* v. Staff.
12. *Nagatoella orientis* (=*F. ellipsoidalis* var. *orientais*) (Ozawa)
13. *Triticites (F.) subobsoleta* Ozawa
14. *S. (F.) satoi* Ozawa
15. *S. (F.) kraffti* Schellwien
16. *Doliolira claudioe* Deprat

上記の化石の中 1, 4, 6, 10 はウラルの Sakmarian より，又 2, 8 は同 Uralian より報告されてゐる種類であつて，13 も *Triticites* 屬に入るべき種類で Uralian 型の fauna といへようと思ふ。卽此處の *Pseudoschwagerina* 帶には Sakmarian と Uralian (狹義) の兩方の fauna を混じてゐるのである。

關東山地の秩父系の著者3)の硏究による *Schwagerina vulgaris* 帶も同樣であつて，之には *Schwagerina prisca*, *S. tschernyschewi* 等の Sakmarian fauna と *Triticites montiparus* 等の Uralian (狹義) fauna が含まれてゐる。

九州大分縣大野郡川登村の石灰岩では著者4)の硏究したところによると *Pseudoschwagerina orientale* Huzimoto の Sakmarian fauna と *Triticites simplex* 其他の Uralian (狹義) fauna が共

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1) A. W. Grabau: The Permian of Mongolia. Nat. Hist. Central Asia, Vol. IV, 1931.

2) Y. Ozawa: Palaeontological Studies on the Limestone of Nagato. Jour. Coll. Scie. Imp. Univ. Tokyo, Vol. XLV, Art. 6, 1925.

3) H. Huzimoto: Stratigraphical and Palaeontological Studies of the Titibu System of the Kwantô-mountainland, Pt. 1, 2. Scie. Rep. Tokyo Bunrika Daigaku. Sec. C, No. 4, 2, 1936.

4) H. Huzimoto: Some Fusulinids from Kawanobori-mura, Kyûsyû, Japan. Journ. Geol. Geogr., Vol. XIV, Nos. 2-3, 1937

存してゐる。

以上要するに從來本邦に於いて Uralian としてゐた地層にはロシヤ及北米の標式的產地の Sakmarian fauna と Uralian fauna を共有してゐる樣である。故にこの本邦の *Pseudoschwagerina* 帶を單に *Pseudoschwagerina* にのみ重きを置いて直ちに Sakmarian とするには多少躊躇を要するのである。

この本邦の *Pseudoschwagerina* 帶と同樣な立場にある地層は東亞大陸にも廣く見出される，卽朝鮮の寺洞統下部・滿洲の黃旗統・北支の太原統・南京地方の船山石灰岩が之である。之等については別に論じたいと思つてゐるので此處では述べないことにするが南京の船山石灰岩については C. O. DUNBAR[1] が既に所見を述べてゐる。氏によると船山石灰岩には *Pseudoschwagerina* と共に *Triticites* を產するのであるが *Pseudoschwagerina* に重きを於いて之は Sakmarian 及び Wolfcampian に相當するものであるとし，南支より印度支那地方では *Triticites* 帶が缺いてゐて船山石灰岩は不整合に黃龍石灰岩に重つてゐると解してゐる。而してこの不整合については FROMAGET の研究に從つて印度支那方面にまで擴まつてゐるものであると述べてゐる。

本邦に於けるこの *Pseudoschwagerina* 帶の問題は單に本邦の *Pseudoschwagerina* 帶の時代論のみに止らず，本邦の石炭系と二疊系の境界問題，續いてはこの地層の更に上位及び下位に重る地層の時代論にも關係するものであつて古生代地史學の重大な問題であると思ふ。東亞に發達する *Pseudoschwagerina* 帶を半澤博士・C. O. DUNBAR・GRABAU の如く *Pseudoschwagerina* 及び *Paraschwagerina* に重きを置いて此の地層をすべて Sakmarian に同定する（この場合には Uralian は缺序することになる）のも1の解釋方法と思はれる。然しながら斯くの如く解釋する際にはこの地層から Uralian (狹義) fauna を實際に產してゐることやこの地層とその下位の地層との間に之まで何等の break も見出[2]されてゐないことなどは如何樣に解釋すべきものであらうか。

自分は只今の知識では本邦に於いては Sakmarian fauna と Uralian (狹義) fauna を層位學的に區別することが出來ない狀態にあると思ふのであるが，今後の精査を俟てば或は Uralian (狹義) と Sakmarian が區別し得るに至るのでないかといふ疑問も抱いてゐる。

# *Pseudoschwagerina* from Akasaka and its Neighbourhood and Some Considerations on the Geological Age of the *Pseudoschwagerina* Zone of Japan

In the autumn of 1939, the writer obtained some specimens of *Pseudoschwagerina* and other foraminifera from the following localities: (1) Akasaka, Gihu-ken. (2) Manganzi, Sakata-gun, Siga-ken. (3) Simonyû, Samegai-mura, Sakata-gun, Siga-ken.

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[1] C. O. DUNBAR: 前出, 1940.

[2] 之については半澤博士の話によると北上山地では丁度この層位に不整合が見出されるといふ．又北支山西太原近方では *Pseudoschwagerina* を出す東大窰石灰岩の下には不整合が（NORIN による）あり，又唐山及び大同炭田では Moscovian と考へられる本溪系の上に直接山西系の夾炭層が重つてゐる．卽ち Uralian 及び Sakmarian が缺けてゐることになつてゐる．この際東亞の *Pseudoschwagerina* 帶の下位に果たして不整合のないものであるかどうか再調査の必要があるとも思つてゐる．

The species from the first locality are *Pseudoschwagerina schellwieni* (YABE) HANZAWA, *Schwagerina regularius* (SCHELLWIEN), *Schwagerina* sp. and *Fusulina* sp. The specimens were collected from the rock slabs of the quarry of Kinsyô-zan of Akasaka, a famous fossil locality of the Titibu System, and their exact geological horizon was not ascertained; but judging from the fossil evidence their horizon probably corresponds to either the Benizima zone[1] or the lower horizon of the Akasaka limestone.

The species from the second locality are *Pseudoschwagerina schellwieni* (YABE) HANZAWA and *Schwagerina* sp. The geology of this district was investigated by T. TAKEYAMA[2] and T. SEKI[3]. The horizon of the present fossils corresponds to the Samegai group of the *Pseudoschwagerina* and *Paraschwagerina* zone of SEKI. According to SEKI, the fossils of this group are as follows:

*Paraschwagerina oblonga* (OZAWA), *Schwagerina* n. sp. (*S. krafti* group), *Pseudoschwagerina* sp., *Schwagerina valgaris* (SCHELLEWIEN), *Schwagerina anderssoni* (SCHELLWIEN), *Doliolina alciae* DEPRAT.

The species from the third locality are *Pseudoschwagerina samegaiensis* sp. nov. The geology of this district was studied by K. TAKIMOTO[4]. The horizon of the present fossil corresponds to (B) the middle of the Ryôsen group of TAKIMOTO, consisting mainly of schalstein. According to TAKIMOTO, this group yields the following fossils:

*Schwagerina vulgaris* (SCHELLWIEN), *S. vulgaris* var. *globosa* (SCHELLWIEN), *S. prisca* (DEPRAT), *S. sdtoi* (OZAWA), *S. prisca* var. *parumula* (SCHELLWIEN), *S. richthofeni* (SCHWAGER), *Mizzia velebitana* SCHUBERT.

The genus *Pseudoschwagerina* which is often accompanied by the genus *Paraschwagerina* is stratigraphically much confined in its occurrence and accepted as an important index-fossil of the basal Permian, such as the Sakmarian of Russia and the Wolfcampian of North America. From this it is inferred that the above-enumerated three *Pseudoschwagerina* beds are probably of the same horizon and correspond to the Sakmarian or Wolfcampian Stage.

Though the *Pseudoschwagerina* zone which produces not only *Pseudoschwagerina* but also many *Triticites* and *Schwagerina*, has so far been believed in Japan and the Eastern Asia to belong to the Uralian or the upper Carboniferous in age, the writer can not contradict that the *Pseudoschwagerina* zone of Japan associates the Uralian (new sense) or Pensylvanian fauna. So that it demands deliberation to believe that the *Pseudoschwagerina* zone of Japan corresponds to the Sakmarian

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1) OZAWA, Y.: Stratigraphical Studies of the *Fusulina* Limestone of Akasaka, etc. Journ. Fac. Sci. Tokyo Imp. Univ., Sec. II, Vol. 11, Pt. 3, 1937.

2) TAKEYAMA, T.: On the Palaeozoic Formations of Mt. Ibuki and Samegai Districts (in Japanese). The Globe, Vol. 20, No. 5, 1933.

3) SEKI, T.: The Upper Palaeozoic Stratigraphy and Structure of Mt. Ibuki and its Neighbourhood (in Japanese and English résumé). Jubilee Publication in the Commemoration of Prof. YABE, Vol. 1, pp. 521-526, 1939.

4) TAKIMOTO, K.: On the Geology of the Mt. Ryôsen and its Neighbourhood, Siga-ken (in Japanese). The Globe, Vol. 26, No. 1, 1936.

or Wolfcampian. If the *Pseudoschwagerina* zone corresponds perfectly to the Sakmarian or Wolfcampian, we must admit theoretically that some stratigraphical break exist between the *Pseudoschwagerina* zone and the Moscovian zone which generally is ascertained under the *Pseudoschwagerina* zone in Japan, but such a break has not been ascertained till now. It is an interesting question whether the Uralian (new sense) Series is lacking or not in Japan.

### *Pseudoschwagerina schellwieni* (YABE) HANZAWA.

Pl. 5(2) Figs. 1–6.

1938 *Schwagerina* aff. *amedai* YABE: Carboniferous-Permian Deposits of the Japanese Islands, Tyôsen (Korea) and Manchuria. Cte. R. du. 2$^{me}$ Congr. p. l'Avanc. d. E'tudes de Stratigr. Carboniferè, p. 1621.

1938 *Pseudoschwagerina schellwieni* (YABE) HANZAWA: Stratigraphical Distributions of the Genera *Pseudoschwagerina* and *Paraschwagerina* in Japan etc. Jap. Jour. Geol. Geogr., Vol. XVI, Nos. 1–2, pp. 71–72.

Shell large, almost spherical, consists of 6–6$^1/_2$ whorls. Proloculum spherical, 0.28–0.36mm in diameter. Juvernarium very distinct, consisting of 2.5–3 closely coiled whorls, but inflation of the whorl being very rapidly at the end of juvenarium, becoming closer again in the final stage of growth. Spirotheca generally thin, about 0.1 mm thick at the last whorl. Keriotheca is fine. Septa very thin, almost plane, chomata well developed at the juvenarium.

Measurements:

| Whorl | Proloculum | I | II | III | IV | V | VI | VII | Specimen |
|---|---|---|---|---|---|---|---|---|---|
| Rate of grouth | 0.28 | 0.56 | 0.88 | 1.60 | 4.64 | 8.16 | 11.52 | | 2238, o. s. Manganzi |
| | | | | | | 6.00? | 10.30 | 12.00 | 2238, e. s. Manganzi |
| | | 0.66 | 0.84 | 2.40 | 5.04 | 7.40 | 8.00? | | 2237, s. s. Manganzi |
| | 0.36 | 0.44 | 0.72 | 1.04? | ? | | | | 1032, a. s. Akasaka |
| | | | | | 4.70 | 7.00 | 8.90 | | 1023, e. s. Akasaka |
| | | 0.500 | 0.75 | 1.25 | 3.75 | 8.00 | 9.10 | 10.00 | After HANZAWA Kitakami |
| Thickness of spirotheca | 0.037 | 0.030 | 0.045 | 0.030 | 0.022 | 0.06 | 0.105 | | 2238, Manganzi |
| | | | | | 0.06 | 0.075 | 0.09 | | 1023, Akasaka |
| | | 0.025 | 0.025 | 0.037 | 0.025–0.037 | 0.040 | 0.080 | 0.112 | After HANZAWA Kitakami |
| Number of septa | | | | | ? | 13? | 18 | 25 | 2238, Manganzi |
| | | ? | 24 | 19 | 11 | 15 | 24 | | 2237, Manganzi |
| | | | | ? | 13? | 18 | 21 | | 1023, Akasaka |
| | | 17 | 23 | 22 | 11 | 15 | 19 | | After HANZAWA Kitakami |

Though present collections are insufficient and exact axial and sagittal sections can not be prepared, the present form agrees well in its inportant characters with *Pseudoschwagerina schellwieni* (YABE) HANZAWA and can be safely identified with the latter.

Locality: Akasaka, Huwa-gun, Gihu-ken and Manganzi, Sakata-gun, Siga-ken.

### *Pseudoschwagerina* cf. *fusulinoides* (Schellwien)

Pl. 5 2) Fig. 7.

1892 *Schwagerina fusulinoides* Schellwien: Die Fauna des Karnischen Fusulinen Kalks. Palaeontographica, XXXIX, pp. 259–260, Taf. XXI, Figs, 1–4, 8.
1909 *Schwagerina fusulinoides* Staff: Beiträge zur Kenntniss der Fusuliniden. Jahrb. f. Min. Geol, u. Pal. Beilage Band, XXVII, p. 467, Pl. VIII, Figs. 11, 12.
1924 *Schwagerina fusulinoides* Beed and Kniker: Species of the Genus *Schwagerina* and their Stratigraphic Significance. Univ. Texas Bull., No. 2433, pp. 19–23, Pl. I, III, VII, Figs. 1–4, 8, 1–3.
1927 *Schwagerina fusulinoides* Lee: Palaeontologia Sinica. Ser. B, Vol. IV, Fasc. I, pp. 118–120. Pl. XXII, Figs. 6–17.
1934 *Schwagerina fusulinoides* Chen: Palaeontologia Sinica. Ser. IV, Fasc. 2, pp. 94–95, Pl. XIV, Figs. 1–4, Pl. XV, Fig. 7.

The present form represented by only one axial section from Simonyû associating with the foregoing species. So that the writer's observation is not complete.

Measurements:

| Whorl | Proloculum | I | II | III | IV | V | VI | VII | Specimen |
|---|---|---|---|---|---|---|---|---|---|
| Rate of growth | 0.18 | 0.34 | 0.52 | 0.84 | 1.44 | 2.80 | 4.92 | | 2104, a. s. Simonyû |
| | 0.13 | 0.25 | 0.48 | 0.93 | 1.60 | 2.40 | 3.30 | | Pl. XXI, Fig. 4. Alpen* |
| | 0.15 | 0.30 | 0.55 | 0.93 | 1.80 | 2.70 | 3.60 | | Pl. XXI, Fig. 2. Alpen* |
| Thickness of spirotheca | 0.037 | 0.030 | 0.041 | 0.045 | 0.060 | 0.072 | 0.072 | 0.090 | 2104, a. s. Simonyû |
| | | | | | | 0.070 | 0.080 | | Pl. XXI, Fig. 4. Alpen* |

* Measured by the author from Schellwien's photomicrograph.

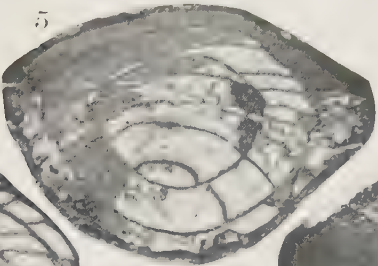
So far as the writer's observation is concerned, the present form agrees well with Schellwien's original specimen, but the exact determination must be postponed until sufficient materials are prepared.

Locality: Simonyû, Samegai-mura, Sakata-gun, Siga-ken.

### *Pseudoschwagerina samegaiensis* n. sp.

Pl. 5(2) Figs. 8–12.

Shell almost spherical, slightly longer than wide. The axial length and width 8.2–11 mm and 6.8–8.0 mm respectively and the axial ratio 1.1 : 1–1.3 : 1. Whorls usually 5–6. Proloculum spherical 0.20–0.32 mm in diameter. Juvenarium very distinct, consisting of 2.5–3 closely coiled whorls, but inflation of the whorls being very rapid at the end of juvenarium, becoming closer in the final whorl. Spirotheca generally thin about 0.1–0.12 mm thick at the last whorl. The keriotheca is fine, about 24. Alveoli occupying a space of 0.5 mm. Septa very thin, 0.030–0.037 mm thick in the final stage of growth. Septa irregularly fluted at their basal and polar parts. Chomata well developed at the juvenarium.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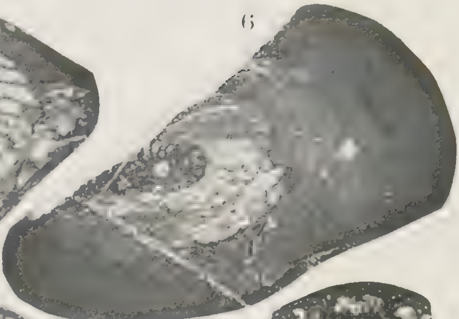
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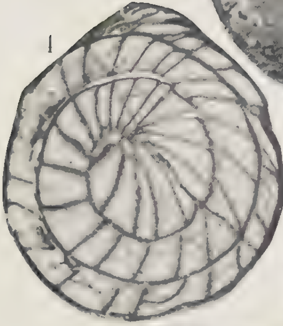
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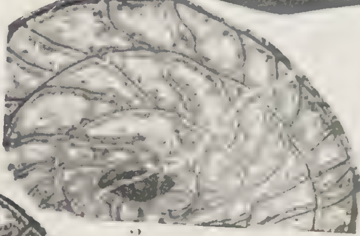
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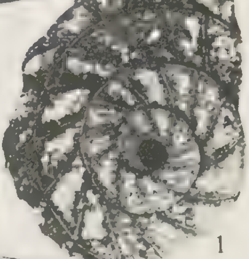
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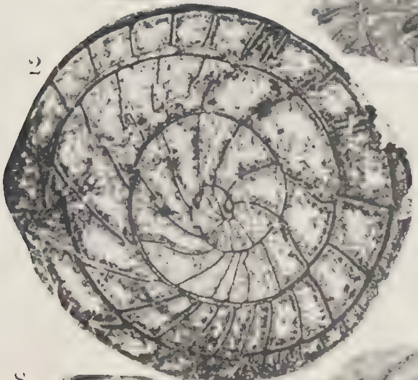
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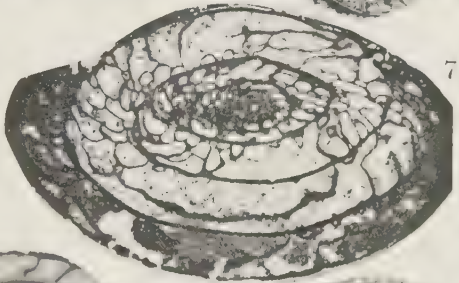
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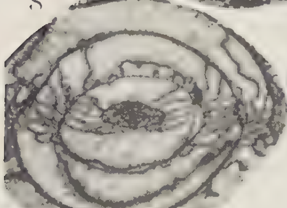
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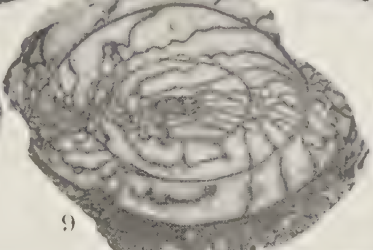
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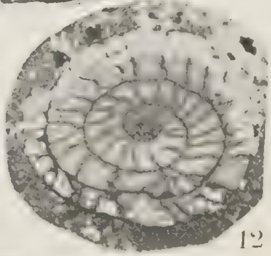
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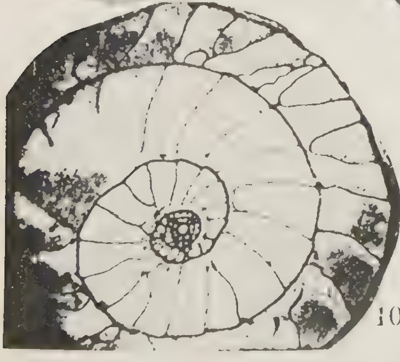
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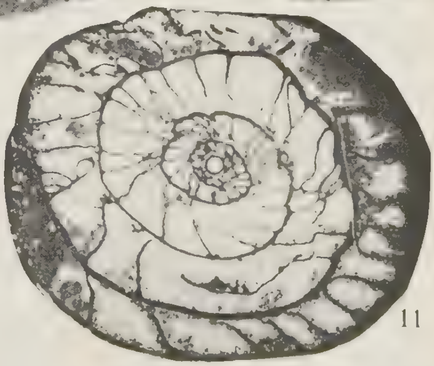
11

Measurements:

| Whorl | Proloculum | I | II | III | IV | V | VI | Specimen |
|---|---|---|---|---|---|---|---|---|
| Rate of growth | 0.20 | 0.40 | 0.60 | 1.70 | 4.50 | 6.30 | 7.5? | 2101, s. s. |
| | 0.32 | 0.48 | 1.00 | 2.00 | 3.80 | 6.00 | | 2101, s. s. α. |
| | 0.30 | 0.48 | 0.74 | 2.00 | 3.48 | 5.28 | | 2324, s. s. |
| | | | 0.5? | 0.8? | 2.90 | 5.50 | 7.30 | 2325, a. s. |
| Thickness of spirotheca | 0.042 | 0.030 | 0.037 | 0.045 | 0.030 | 0.075 | 0.120 | 2101, s. s. |
| | 0.033 | 0.030 | 0.037 | 0.052 | 0.045 | 0.097 | 0.105 | 2101, s. s. α. |
| Number of septa | | 11 | 16 | 18 | 17 | 26 | 31? | 2101, s. s. |
| | | 8 | 16 | 19 | 23 | 19 | | 2101, s. s. α. |
| | | 11 | 19 | 17 | 21 | 26 | | 2324, s. s. |

Remarks: The present species resembles *Pseudoschwagerina uddeni* (BEEDE and KNIKER)[1] in size and internal structure, but it differs markedly from the latter in external form, being notably spherical without any elongated poles. It is more closely allied to *Pseudoschwagerina turbida* FRANZ and Gustava KAHLER[2] in its shape, size and to some degree in internal structure, but the former has generally a much larger proloculum and thin delicate septa not thickening at its basal part.

Locality: Simonyû, Samegai-mura, Sakata-gun, Siga-ken.

## Explanation of Plate 5(2)

*Pseudoschwagerina schellwieni* (YABE) HANZAWA

Fig. 1. A sagittal section. Manganzi, Sakata-gun, Siga-ken. ×9. Rg. No. 2237.
Fig. 2. A nearly sagittal section. Manganzi, Sakata-gun, Siga-ken. ×9. Rg. No. 2238.
Fig. 3. An oblique section. Manganzi, Sakata-gun, Siga-ken. ×9. Rg. No. 2238.
Fig. 4. An excentric section. Akasaka, Gihu-ken. ×9. Rg. No. 1023.
Fig. 5. A tangential section. Akasaka, Gihu-ken. ×9. Rg. No. 1032.
Fig. 6. A sagittal section. Akasaka, Gihu-ken. ×9. Rg. No. 1032.

*Pseudoschwagerina* cf. *fusulinoides* (SCHELLWIEN)

Fig. 7. A nearly axial section. Simonyû, Samegai-mura, Sakata-gun, Siga-ken. ×9. Rg. No. 2104

*Pseudoschwagerina samegaiensis* sp. nov.

Figs. 8, 9. Nearly axial sections. Simonyû, Samegai-mura, Sakata-gun, Siga-ken. ×4.5. Rg. No. 2325, 2323.
Figs. 10, 11. Sagittal sections. Simonyû, Samegai-mura, Sakata-gun, Siga-ken. ×9. Rg. No. 2101.
Fig. 12. A sagittal section. Simonyû, Samegai-mura, Sakata-gun, Siga-ken. ×4.5. Rg. No. 2324.

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[1] BEEDE and KNIKER: Species of the Genus *Schwagerina* and their Stratigraphic Significance. Univ. of Texas Bull., No 2433, 1924.

[2] FRANZ und KAHLER, G.: Die *Pseudoschwagerinen* der Grenzlandbänke und des oberen Schwagerinenkalkes. Palaeontographica, Bd. LXXXVII, Abt. A, 1937.

# *Über einen neuen hydrochoeren Riesennager aus dem Pleistozän von Ekuador**

von

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(Eingelangt am 21. Oktober 1940; Vortrag, gehalten am 15. Februar 1941.)

Die Ausgrabungen in der Nähe des Ortes "La Libertad", auf der Halbinsel Sta. Elena, an der Küste Ekuadors, zeitigten unter anderen auch Reste eines Riesennagers, der zusammen mit den Knochen von *Megatherium* und *Mylodon* gefunden wurden. Die Reste sind spärlichsodass sich das zu beschreibende Material auf einen linken Unterkieferast mit kompletter Bezahnung der Backenzahnreihe und drei einzelne Backenzähne der entsprechenden rechten Unterkieferhälfte beschränkt.

Es handelt sich um einen fossilen hystricoiden Nager, dessen Ursprung und Entwicklungszentrum rein südamerikanisch sind. Im mittleren Tertiär scheint in diesem Kontinente die Nagetierfauna fast ausschliesslich aus Hystricoiden bestanden zu haben, während wir heute ein Vorherrschen von Myoidea antreffen, die gegen das Ende des Miozän aus Nordamerika eingewandert sein müssen (Nach Scott). Wenngleich auch heute *Hydrochoerus* nicht mehr zur eigentlichen Fauna der Halbinsel Sta. Elena gehört, selbst in der weiteren Umgebung nicht mehr zu finden ist, so könnte vielleicht doch noch in den niederschlagreicheren Gebieten, in den Urwäldern des Hinterlandes vorkommen, wenngleich wir seine Existenz nicht sicher feststellen konnten. Sicher nachgewiesen ist das Wasserschwein auf ekuatorianischem Boden, auf den anderen Seite der Kordillere, aus den feuchten Urwaldgebieten des Amazonastieflandes.

Trotz seiner weiten Verbreitung durch fast das ganze tropische Südamerika, ist *Hydrochoerus* nur durch eine einzige lebende Art vertreten. Sie bilden eine Unterfamilie der caviidae, nämlich der hydrochoerinae.

Die vorliegende Arbeit wiedem ich meinem Freund und Mitarbeiter Herrn Torakiti Sirasaka, der der wissenschaftlichen Erschliessung der Provinz Esmeraldas in Ekuador, zum Opfer gefallen ist. Die oben genannten fossilen Reste stammen aus dem von mir als Beta bezeichneten Knochenhorizont, plestozäner Ablagerungen eines alten Flussdelta. Diese Ablagerungen finden wir heute an der niederen Steilküste bei dem Campamente der Carolina Oil Co., unmittelbar am Meeresstrande, etwa zwei Meter über dem normalen Wasserstand. Der fossilführende Horizont, der an einigen Stellen bis 50 cm Breite erreichte, besteht aus verwitterten, staubförmigen Material, das durch seinen Asphaltgehalt, jene typische kaffeé-braune

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* Transactions of the Palaeontological Society of Japan, No. 121.

Farbe bedingt, die auch die Knochen aufzuweisen haben[1]. Als Begleitfauna finden wir typische Elemente eines einst steppenaritgen Lebensraumes, wie das im Massen vorkommende Pferd (*Neohippus*), ein Lama (*Protauchenia*) verschiedene kleine Nagerarten, *Megatherium* und *Mylodon* von mittlerer Grösse, den Säbeltieger (*Smilodon*), einige Wildhunde wie Protolycalopex und Palaeospeothus und schliesslich einen fossilen Hirsch (*Palaeoodocoileus*). In den Süsswasser führenden Flüssen tummelten sich Krokodile und Schildkröten. Bei jener üppigen Vegetation, deren Reste ebenfalls erhalten sind, finden wir auch viele Insekten, die ihrerseits einer reichlichen Avifauna ihr Dasein sicherten. Auch Schlangenreste, Froschknochen etz., konnten wir in diesen an Fossilien reichen Ablagerungen finden. Wenn wir aber diese Gegend, wie sei sich heute, im biologischen Sinne als Lebensraum präsentiert, betrachten, so finden wir wüstenartige Gebiete, mit fast vollkommenen Süsswassermangel während der langandauernden Trockenperiode, die den Wirbeltieren des Landes, mit Ausnahme weniger Vogelarten, bei ausnehmend armer Individuenzahl, kaum einem Säugetier aber die Lebensmöglichkeit geben.

## ***Prohydrochoerus* genus nov.**

Die in seiner vorzüglichen Arbeit von Lucas Kraglievich aufgestellten Charaktere der rezenten und fossilen Hydrochoeridae[2], stimmt kaum mit den osteologischen Merkmalen unseres Riesennagers aus Sta. Elena überein. Es liegt im Wesen der allgemeinen Entwicklungstendenz dieser Nagetiere, zur clasmodonten Zahnform überzugehen, wenngleich innerhalb der verschiedenen Formen dieser Weg sehr schwer wieder zu erkennen ist. So finden wir selbst bei den fossilen Arten, oft viel weiter vorgeschrittene Entwicklungsstadien, als bei den rezenten Wasserschweinen (*Hydrochoerus*), was die systematische Eingliederung sehr erschwert.

Die Gattung *Hydrochoerus* (Brisson) zeichnet sich durch seine geringe Grösse, durch die viel kompliziertere Bauart der Zähne, speziell des dritten oberen Molar aus. Bei den rezenten Formen, handelt es sich auch um Tiere einer besonderen Anpassung an das Wasser- und Sumpfleben, der Schädel ist viel gedrungener, sodass das Diastem am Unterkiefer kürzer ist als die Zahnreihe. Auch der Körper ist mehr gedrungen und die Gliedmassen relativ sehr kurz, im Gegensatz zur zweiten, nur fossil bekannten Gattung von *Protohydrochoerus* (Rovereto) Von *Hydrochoerus* selbst kennen wir einige wenige fossile und subfossile Arten, die, wie uns *Hydrochoerus holmeri* aus Florida beweisst, einst ein viel weiter nach dem Norden reichendes Verbreitungsgebiet hatten. *Protohydrochoerus* andererseits ist ein typisches Steppenoder Lauftier ; Schädel und Gliedmassen sind mehr gestreckt, sodass auch das Diastem am Unterkiefer länger ist als die Zahnreihe selbst. Sowohl bei

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(1) Eine eingehendere Beschreibung der geologischen Verhältnisse der Knochenfundstellen der Halbinsel Sta. Elena finden sich in folgenden Arbeiten :

F. Spillmann : Nuevos cánidos fósiles y subfósiles de la República del Ekuador. 1940.

„ : Contribución al conocimiento de fósiles nuevos de la avifauna ekuatoriana, en el pleistoceno de Sta. Elena. 1940.

(2) Lucas Kraglievich : Los más grandes carpinchos actuales y fósiles de la subfamilia "Hydrochoerinae". Anales d. l. Sociedad Cientifica Argentina. CX, pp. 233-250.

*Hydrochoerus* als auch bei *Protohydrochoerus* finden wir am dritten unteren Molar das erste Lamellenpaar am Aussenrande durch eine schmale Brücke verbunden, während *Prohydrochoerus* alle Lamellen frei hat, also dieser Zahn einen rein elasmodonten Typ darstellt. Nach Kraglievich soll für *Hydrochoerus* sechs, für *Protohydrochoerus* fünf, die Normalzahl an Lamellen sein. Auch unser Fossil nähert sich in dieser Beziehung mehr dem *Protohydrochoerus*, ist also wie dieses phylogenetisch viel höher stehend als die rezenten Wasserschweine und könnte eventuell ein direkter Nachkomme von *Protohydrochoerus* sein. Dieser dritte untere Molar ist auch bei unserem Riesennager aus Sta. Elena, viel kürzer, denn er erreicht an Länge nicht wie bei der rezenten Form etwas weniger als die Hälfte vom vierten Prämolar, ersten und zweiten Molar insgesamt, sondern annähernd nur kaum ein Drittel. Der untere dritte Molar ist also nicht allein rein elasmodont, sondern auch viel mehr reduziert als bei *Protohydrochoerus* wie auch beim lebenden Wasserschwein. Ausnahmsweise soll man aber auch bei *Hydrochoerus* alle sechs Lamellen antreffen. Der zweite untere Molar unseres Fossils, nach seiner Form zu schliessen, ist sehr ähnlich dem von *Hydrochoerus*, denn die zwei Mittellamellen sind auch hier frei.

Der erste untere Molar andererseits ist sehr ähnlich dem von *Protohydrochoerus*, ebenso wie der vierte Prämolar derselben Zahnreihe wieder mehr der Gattung *Hydrochoerus* nahe steht. Als Differential-Charaktere finden wir also einen fossilen, phylogenetisch höher stehenden Hydrochoeridae, eine Gattung die selbst von der rezenten Gattung *Hydrochoerus* noch nicht erreicht wird, denn der dritte untere Molar besteht gewöhnlich aus fünf Lamellen; das Diastem ist kurz, Merkmale wodurch er sich auch von *Protohydrochoerus* unterscheidet.

## *Prohydrochoerus sirasakae*, species nov.

Die Beschreibung des Materiales:

Die Gesamtlänge der Backenzahnreihe ist 116 mm; davon haben:

$P_4$ eine Länge von 28 mm, bei einer grössten Breite von 13 mm an der letzten Zahnlamelle:

$M_1$ hat eine totale Länge von 28.5 mm und seine grösste Breite an der Zahnmitte beträgt 14 mm.

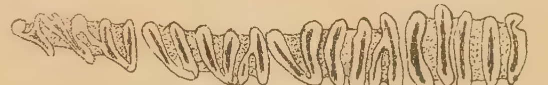
$M_2$ hat eine Länge von 29 mm, an der Zahnmitte finden wir die grösste Breite mit 17 mm; und schliesslich der.

$M_3$ misst der Länge nach 29 mm und erreicht seine grösste Breite an der Zahnmitte mit 21 mm.

Der vierte untere Prämolar:

Im Unterkiefer haben die Zähne eine mehr übereinstimmenede Länge. Der einzige Prämolar dieser Zahnreihe besteht aus drei V-förmigen Lamellen, die sich nach innen öffnen. Die erste Lamelle besitzt am Vorderrande und an der Innenseite eine knotenartige Verdickung und ist im allgemeinen schwach gekerbt. Das zweite V-förmige Lamellenpaar zeigt bereits am vorderen Schenkel eine schwache Einbuchtung, die etwa 2 mm in die Lamelle hineinreicht. Der hintere Art bildet am Innenrande eine mächtige Schlinge, die fast bis in die Mitte des Zahnes reicht, sodass die Form dieses Lamellenpaares mehr als S-förmig anzusprechen wäre. Das dritte oder letzte Lamellenpaar öffnet sich nach innen und ist tief eingeschnitten. Während an den übrigen Zähnen die Lamellen, seien diese einfach oder zusammengesetzt immer von einander getrennt sind, diese ihrerseits nur durch Zahnzement zum eigentlichen elasmodonten Zahn vereint werden, so ist der vierte Prämolar dadurch gekennzeichnet, dass die Schmelzfältelung einheitlich ist und sich der Zement nur in die Einschnitte hinein drängt. Auch bei *Protohydrochoerus* und dem rezenten *Hydrochoerus* finden wir dieselben Verhältnisse.

Typisch an unserer fossilen Form aus Sta. Elena ist der Vorderteil dieses Zahnes, da er sehr ähnlich ist wie bei *Hydrochoerus*, aber verschieden von *Protohydrochoerus*. Der Mittelteil ist nicht V-förmig sondern S-förmig wie bei keiner der beiden Formen und schliesslich das Letzte Lamellenpaar gleicht dem von *Protohydrochoerus* und ebenso dem von *Hydrochoerus*, während nach Kraglievich der erste Zahn von *Protohydrochoerus* dem letzten an Länge fast gleich kommt, ist er bei *Prohydrochoerus sirasakae* der kleinste. Bei der rezenten Form ist aber dieser Zahn scheinbar der Längste.



*Prohydrochoeus sirasakae* Spill.

Für die systematische Bewertung der Hydrochoeridae ist auch die Form des unteren vierten Prämolaren sehr wichting. Er ist unbedingt in seinem Bau der primitivste Zahn, der sich dem Zahnbau der Cardiotheriinae von Kraglievich am meisten nähert.

Der erste untere Molar:

Der zweite Zahn im Unterkiefer ist der erste Molar. Er besteht aus drei V-förmigen, unter einander getrennten, Lamellen, wovon sich die ersten zwei nach innen, die letzte aber nach aussen öffnet. Sehr tief eingeschnitten sind bloss die ersten zwei Lamellen, während die dritte, die mit ihrem viel kleineren vorderen Schenkel noch mit der Mittellamelle an der Aussenseite zusammenhängt, schwach eingeschnitten ist. Dieser Zahn hat dadurch vier Einschnitte an der Innenseite und nur zwei an der Aussenseite. Im allgemeinen unterscheidet sich dieser Zahn im Bezuge auf seine Gestalt kaum von den hier angeführten Vergleichsformen.

Der zweite untere Molar:

Dieser Zahn besteht aus einer vorderen und einer hinteren V-förmigen und zwei freien mittleren Lamellen. Davon ist die erste V-förmige Lamelle nach innen geöffnet und tief eingeschnitten, ähnlich wie bei *Protohydrochoerus* von Kraglievich und im Gegensatz zum rezenten Wasserschwein, wo wir nur einen schwachen Einschnit vorfinden. Es folgen nun zwei einfache freie Lamellen, ähnlich wie bei der rezenten Form und im Gegensatz zu *Protohydrochoerus*, wo dieses Lamellenpaar an der Aussenseite noch zusammerhängt. Das hintere V-förmige Lamellenpaar ist von geringer Bedeutung für die Systematik. Der zweite untere Molar unseres Fossils nähert sich also mehr dem Wasserschwein der Gegenwart als *Protohydrochoerus*, wenngleich auch bei ersteren mitunter diese Lamellen noch zusammenhängen sollen. Von besonderer systematischer Bedeutung ist also dieser Zahn kaum.

Der dritte untere Molar:

Er besteht aus fünf einfachen Lamellen wovon die letzte noch an der Innenseite des Zahnes eine ganz geringe Einbuchtung angedeutet hat. Nach Kraglievich hat auch *Protohydrochoerus* aus Argentinien fünf Lamellen, wovon aber die ersten zwei am Aussenrade des Zahnes zusammenhängen. Die rezente Form hat nach denselben Autor sechs Lamellen, wovon ebenfalls noch die ersten zwei an der Aussenseite verbunden sind, während nach Giebel[1] auch bereits sechs Lamellen vorkommen sollen, die alle frei sind. Die Zementzwischenlagen sind bei diesem Zahn recht kräftig. Er ist im Gegensatz zu den übrigen fossilen und auch rezenten Tieren, sehr kurz, denn er beträgt nicht wie beim rezenten Wasserschwein etwas weniger als die Hälfte der übrigen Elemente der Bezahnung insgesamt, sondern annähernd ein schwaches Drittel. Wir finden hier also eine viel weiter vorgeschrittene Reduktion des letzten Molar im Unterkiefer. Entschieden ist dieser Zahn der wichtigste für die Bestimmung, denn er unterscheidet sich nicht allein durch seine jeweilige Grösse, sondern auch durch seine Form.

Die sosehr markanten Unterschiede in der Form der einzelnen Zähne und ebenso der ganz gewaltigen Grössenverhältnisse haben mich veranlasst jene neue Gattung aufzustellen, die ich *Prohydrochoerus* nenne.

Vergleichende Masse:

Die von mir in der folgenden Tabelle zusammengestellten vergleichenden Masse von *Protohydrochoerus* und *Hydrochoerus* habe ich aus Tafeldarstellungen kalkuliert, sind also nicht als ganz genau anzunehmen.

| Masse : | *Protohydrochoerus* | *Prohydrochoerus* | *Hydrochoerus* |
|---|---|---|---|
| Länge der Zahnreihe | 115.5 mm | 116 mm | 75–85 mm |
| Verhältnis der Länge zur Breite des $P_4$ | 30 : 12<br>(2.5) | 28 : 13<br>(2.15) | 21 : 9<br>(2.33) |
| Verhältnis der Länge zur Breite des $M_1$ | 25 : 13.5<br>(1.85) | 28.5 : 14<br>(2.03) | 16.5 : 9<br>(1.83) |
| Verhältnis der Länge zur Breite des $M_2$ | 26 : 16.5<br>(1.57) | 29 : 17<br>(1.70) | 18.5 : 11<br>(1.68) |
| Verhältnis der Länge zur Breite des $M_3$ | 30 : 21<br>(1.43) | 29 : 21<br>(1.38) | 19.5 : 11<br>(1.30) |

Besonders markant ist also die Tendenz des überganges in eine rein elasmodonte Zahnform: sie ist bei unserem *Prohydrochoerus sirasakae* aus Sta. Elena beiweiten noch mehr vorgeschritten als selbst bei den rezenten Wasserschweinen. Die allgemeine Form der Unterkiefer mit einem relativ kurzen Diastem würde uns mehr zur überzeugung führen, dass es sich bei *Prohydrochoerus* mehr um ein Tier handelt, das wie *Hydrochoerus hydrochoeris* LIN., die einzig lebende Art, ein guter Schwimmer, sich stehts in der Nähe von Flussläufen aufhält. Im Gegensatz dazu finden wir, dass *Protohydrochoerus*, wie dies KRAGLIEVICH nachgewiesen hat, mehr die Merkmale eines Steppen- und Lauftieres aufweisst, wie die Verlängerung von Humerus und Femur, sowie des Schädels selbst erkennen lassen. Wenn auch heute die Halbinsel Sta. Elena keine Süsswasserflüsse mehr besitzt, so müssen wir in Hinblick auf den enormen Reichtum an Säugetier- und Vogelresten aus pleistozänen Flussablagerungen doch annehmen, dass diese Gegend einst ein ganz anderes Klima besessen hat als heutz. Zumindest müssen wir uns eine fruchtbare Steppenlandschaft vorstellen, die von einigen, wenn auch kleinen Süsswasserflüssen durchquert wurde.

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[1] C. C. Giebel: Odontographie. Leipzig, 1855.

(Quito, 9. August, 1940.)

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## エクアドルの最新世より得だ大型齧歯類 Hydrochoerinae の新屬に就て（摘要）

Franz SPILLMANN

本化石はエクアドル國太平洋岸サンタ•エレナ半島，ラ•リベルター附近の崖に露出するデルタ堆積中の化石帶に發見さる。本化石帶の時代は Pleistocene に屬し，筆者は β 化石帶と呼ぶ。化石帶の厚さ約 50 cm，アスファルトの存在により化石は茶褐色を帶ぶ。隨伴せる動物群は主として草原性にして *Neohippus* · *Protauchenia* · *Smilodon* · *Protolycalopex* · *Palaeospeothus* · *Palaeoodocoileus* · *Megatherium* · *Mylodon* · 數種の小型齧齒類•其他鰐龜 · 多數の昆蟲 · 現棲種の鳥類 · 蛇 · 蛙等發見さる。

化石は大臼齒を完全に有する左側下顎骨 1 個及び 3 個の分離せる下顎臼齒にして Caviidae 科の亞科 Hydrochoerinae に屬す。

著者は本化石により *Prohydrochoerus sirasakae* なる新屬新種を創れり。現生 *Hydrochoerus* 屬は水中及び濕地に棲息し，短頭，短軀，四肢短し。齒隙は下顎に於て齒列より短し。*Protohydrochoerus* 屬は草原性にして，頭骨及び四肢長く，齒隙は齒列より長し。*Hydrochoerus* 及び *Protohydrochoerus* に於ては lamellae に狹き連絡あるも *Prohydrochoerus* は純然たる elasmodont なり。齒隙及び齒の構造より見て *Prohydrochoerus* は *Hydrochoerus* 及び *Protohydrochoerus* の中間型なるべし。

本稿をエクアドル・エスメラルダス州に於て調査に從事中不幸にも犧牲となりし故白坂虎吉技師の靈に捧ぐ。

（摘要　大町四郎）

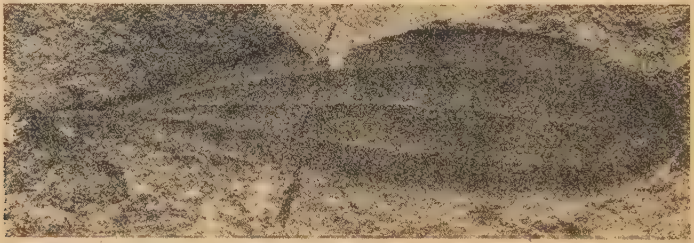
# 東亞產の *Macclintockia* 屬に就て*

理學博士　遠　藤　誠　道

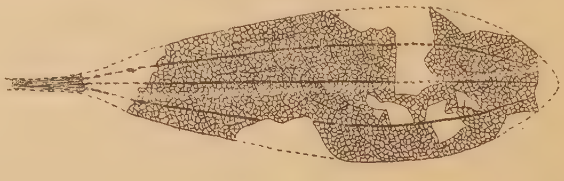
（昭和15年6月29日講演，12月11日受理）

此絕滅屬 *Macclintockia* の分類上の位置は未だ確定して居ない。Oswald Heer は「グリーンランド」の「アタニケルドルク」產標品に Daphnogene と命名し *Cinnamomum* に似て居るので Lauraceae（楠科）と考へた。Saporta 及び Marion は *Cocculus* に似てゐるからとて之を Menispermaceae と見た。又 *Macclintockia trinervis* に對して Oswald Heer は最初 Proteaceae と見，次に Menispermaceae と考へ Saporta 及び Marion に賛成し，最後に Urticaceae を選んだ。Seward は初め ***Macclintockia*** が Dioscoreaceae 又は Liliaceae と見て居たが，最近では ***Boehmeria*** に似て居るからとて是を Urticaceae と考へて居る。併し *Macclintockia lyallii* に對しては Seward 及び Conway は *Melalenca cunningiana*（Malayan species)に近似であるとの理由で，Myrtaceae に屬するものと考へて居られる。最近著者は日本產（神戶附近のもの)の *Macclintockia lyallii* の保存良好な標本について反射顯微鏡により詳細に觀察せる結果，その細脈が日本產ヒルムシロ *Potamogeton franchetii* A. Benn et Baag. に似て居るし，葉形も大體類似して居るから少くとも *Macclintockia* の或種には Potamogetonaceae に屬するものが含まれて居る可能性があることを確認するに到つた。東亞產の *Macclintockia* で東北帝國大學理學部地質學古生物學教室所藏のものには別記の如き種がある（英文參照)。

*Macclintockia* の地質時代的分布は上部白堊紀より新生代中新世までなることは明らかであるが，その最も多きは Palaeogene である。而して *Macclintockia trinervis* Heer（第1圖•第2圖)，は日本群島に於ては幌內層又は夫れと同一地質時代頃に最も多いと見られる（種の記載は略す)。



第1圖 *Macclintockia trinervis* Heer ×2/3. (Sinozaki, Photo.)
Collected by Y. Ishiwara, from Tei, Maoka-mati, Karahuto. (Nisisyakutan Formation)



第2圖 *Macclintockia trinervis* Heer ×1/3. (Yamamoto, Del.)
Collected by S. Endô, from Horonitatibetu, Numata-mura, Uryû-gun. Hokkaidô.

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* Transactions of the Palaeontological Society of Japan, No. 122.

# The Genus *Macclintockia* from East Asia.

(Résumé)

By

Seidô ENDÔ

We have no definite information as to the systematic position of the genus *Macclintockia*; some species of the genus has usually been recognised as a representative of the Urticaceae or Myrtaceae on the ground of similarity in the leaves but one of the species, *M. lyallii* from Kôbe, has great similarity to the leaves of *Potamogeton franchetii*, one of the species of Potamogetonaceae.

From the geological occurrences it appears that the genus was widely distributed from the Cretaceous to the Miocene, but it was absent in East Asia in the upper Miocene age. The specimens, which were stored in the Institute of Geology and Palaeontology of the Tôhoku Imperial University, Sendai, are as follows:

I. *Macclintockia trinervis* HEER.
   Localities:
   1. Tei, Maoka-mati, Karafuto. (Nisisyakutan formation) (Figure 1.)
   2. Honbetu, Mikasayama-mura, Sorati-gun, Hokkaidô. (Poronai Series)
   3. Horonitatibetu, Numata-mura, Uryu-gun, Hokkaidô. (Poronai Series) (Fugure 2.)
   4. Yubari-mati, Yubari-gun, Hokkaidô. (Poronai Series)
   5. Otiai-ike, Suma-ku, Kôbe, Honsyû.

II. *Macclintockia* cfr. *trinervis* HEER.
   Locality:
   Konsyun, Manchoukuo.

III. *Macclintockia lyallii* HEER.
   Locality:
   Okuhata, Suma-ku, Kôbe, Honsyû.

IV *Macclintockia sachalinensis* KRYSHTOFOVICH
   Locality:
   Tymovskaya Padj near Niklewicz's coal mine, North Saghalin.

# 志摩木場洪積統の有孔蟲類*

理學博士　槇　山　次　郎
中　川　保

（昭和 16 年 2 月 15 日講演，2 月 24 日受理）

志摩電鐵迫間（ハザマ）驛の南方 330 m の段地麓切取りに就いて松下進學士が先に記述し（地球 18 巻，36 頁），大炊御門經輝學士が其貝類化石を同定（地球 19 巻，305 頁）した。14 年初夏の頃化石實習の材料を得んがため學生諸氏を連行し同地を訪れたが，切取りが古くなつたために貝類はあまり多くは採取し得なかつた。洪積統の貝化石は注意をひき，可成に良く調べがついて來たが，有孔蟲化石を檢出する仕事はまだ殘つてゐる。我々は其手始に志摩木場の上記產地の材料に就いて簡略に報告する事にした。

同定した種は次に示す 80 種である。標本の不完全にして不足であるものは確定できず屬名だけを定めた。

| | |
|---|---|
| *Textularia gramen* d'ORBIGNY | F |
| *Textularia* sp. | R |
| *Quinqueloculina agglutinans* d'ORBIGNY | A |
| *Lenticulina* (*Robulus*) *gibba* (d'ORBIGNY) | R |
| *Lenticulina* (*Robulus*) *limbosa* REUSS | R |
| *Glandulina laevigata* d'ORBIGNY | R |
| *Dentalina communis* d'ORBIGNY | R |
| *Dentalina emaciata* REUSS | R |
| *Saracenaria italica* DEFRANCE | R |
| *Lagena hexagona* (WILLIAMSON) | F |
| *Lagena* cf. *striata* d'ORBIGNY | R |
| *Lagena striata strumosa* REUSS | F |
| *Lagena semistriata* WILLIAMSON | A |
| *Lagena laevis* (MONTAGU) | R |
| *Lagena clavata* (d'ORBIGNY) | F |
| *Legena gracillima* (SEGUENZA) | F |
| *Lagena ampulla-distoma* (RYMER-JONES) | F |
| *Lagenodosaria scalaris* (BATSCH) | R |
| *Guttulina lactea* (WALKER and JACOB) | R |
| *Guttulina yamazakii* CUSHMAN and OZAWA | C |
| *Guttulina* cf. *kishinouyi* CUSHMAN and OZAWA | R |
| *Polymorphina charlottensis* CUSHMAN | R |
| *Polymorphina* sp. | R |
| *Sigmorphina simaensis* n. sp. | R |
| *Nonion scapha* (FICHTEL and MOLL) | A |
| *Nonion boueana* (d'ORBIGNY) | A |
| *Nonion* sp. | R |
| *Elphidium crispum* (LINNÉ) | A |
| *Elphidium advenum* (CUSHMAN) | R |
| *Elphidium granulosum* GALLOWAY and WISSLER | R |
| *Elphidium simaense* n. sp. | R |
| *Elphidium faba* (FICHTEL and MOLL) | R |
| *Elphidium* sp. | R |
| *Bolivina dilatata* REUSS | R |
| *Bolivina striatula* CUSHMAN | F |
| *Bolivina robusta* BRADY | R |
| *Bolivina pusilla* SCHWAGER | C |
| *Bolivina hantkeniana* BRADY | R |
| *Bolivina subangularis* BRADY | R |
| *Bolivina strigosa* BRADY | C |
| *Loxostoma karrerianum* BRADY | R |
| *Bulimina marginata* d'ORBIGNY | C |
| *Bulimina simaensis* n. sp. | R |
| *Bulimina* sp. | R |
| *Geminospira simaensis* n. gen. n. sp. | C |
| *Reussella spinulosa* (REUSS) | A |
| *Uvigerina* cf. *peregrina* CUSHMAN | R |
| *Hopkinsina* sp. | R |
| *Siphonogenerina raphana* (PARKER and JONES) | C |
| *Siphonogenerina striata* SCHWAGER | C |
| *Entosolenia globosa* (MONTAGU) | R |
| *Fissurina orbignyana* (SEGUENZA) | R |
| *Fissurina lacunata* BURROWS and HOLLAND | R |
| *Fissurina marginata* (WALKER and BOYS) | R |
| *Oolina laevigata* d'ORBIGNY | R |
| *Oolitellla irregularis* n. gen. n. sp. | C |
| *Discorbis rosacea* (d'ORBIGNY) | R |
| *Rotalia beccarii* (LINNÉ) | R |

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* Transactions of the Palaeontological Society of Japan, No. 123.

| | |
|---|---|
| *Rotalia japonica* HADA | A |
| *Rotalia papillosa compressiuscula* BRADY | C |
| *Rotalia schroeteriana* CARPENTER | R |
| *Eponides dutemplei* (d'ORBIGNY) | A |
| *Eponides exigna* (BRADY) | R |
| *Cancris auricula* (FICHTEL and MOLL) | C |
| *Cancris oblonga* (WILLIAMSON) | F |
| *Cymbaloporella bradyi* CUSHMAN | C |
| *Cassidulina orientale* CUSHMAN | R |
| *Globigerina bulloides* d'ORBIGNY | A |
| *Globigerina inflata* d'ORBIGNY | R |
| *Globigerina aequilateralis* BRADY | R |
| *Globigerina cretacea* d'ORBIGNY | R |
| *Globigerina* sp. | R |
| *Globigerina* (*Globigerinoides*) *rubra* (d'ORBIGNY) | C |
| *Globigerina* (*Globigerinoides*) *triloba* REUSS | R |
| *Orbulina universa* d'ORBIGNY | R |
| *Pulleniatina obliquiloculata* (PARKER and JONES) | R |
| *Globorotalia hispida* MS. | R |
| *Anomalina punctulata* d'ORBIGNY | C |
| *Planulina wuellerstorfi* SCHWAGER | R |
| *Cibicides bertheloti* (d'ORBIGNY) | R |
| *Cibicides lobatulatus* (WALKER and JACOB) | F |

Notes: R, specimens less than 4; F, more than 5 but less than 10; C, over 10 but less than 20; A, more than 20.

表中の種に就き特記すべきものだけを抜き，下に其事項を略記する。この發表は新屬新種の公式な記載を含んでゐるけれども夫等の詳細は別の機會まで殘してある。

***Textularia*** sp.

唯１つの標本があるのみで或は既知種の畸形物であるかも知れない。後部の各室が急に增大するもので圖示せられある何れの形にも相當しない。

***Guttulina yamazakii*** CUSHMAN and OZAWA, 1929.

頭記の種に同定したけれども，實は本種の 1 亞種 *kishinoueyi* との中間形であると思ふ。然しなほ此亞種に近い別のものが出てゐる。

***Polymorphina*** sp.

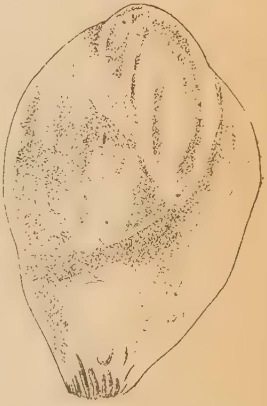
唯 3 つあり。*P. charlottensis* の微球型の幼少なる個體に類似するが，それであると斷定するを憚る。

***Polymorphina*** (***Sigmorphina***) ***simaensis*** n. sp.（第 1 圖）

唯１個體であるから新種として公表するには材料不足であるが，兎に角，小澤氏の總括的な報文に見當らぬ處の，特異な形狀を具ふるものであるから，暫定して種名を附けた。

種の特徵を要約すれば次の如くである。

殼は稍平たく，卵なりで，底頂兩端は圓味あつて角ばり，一番幅の廣い所は稍下方に位置する。各室は割合に短い方で左巻き（時計の針とは逆）に配列し，縫合は明確に凹みを成す。本種は *Sigmorphina kotoi* CUSHMAN and OZAWA, 1930 なる越後夏川の種に似たる所が少しくあるが巻き方が逆であり，底部が夫程に圓く廣くはなつてをらず，各室が短い形である。長さ 0.9，幅は 0.5 mm。



第 1 圖　*Sigmorphina simaensis* n. sp. ×100

屬名は *Sigmorphina* を最適とするが，之は *Polymorphina* の亞屬として見た。新しい試みである。なる程，室の配列は小澤氏の所說の如くであつて，其正しい認識は同氏の非凡なる觀察眼と不斷の努力の賜物ではあるが，私は自然分類の見地から，模型を製作しつゝ配室の變異を觀察して考へて，區分の整理をなし，もつと簡略化すべきものとしてゐる。

***Nonion*** sp.

他の *Nonion* の 2 種は數多くあるのに，此者は唯 1 つである。室數の少い，孔の粗目にあり，縫合が周縁に法線に走る形。類例を知らないが，しばらく無名のまゝに預りおく。

***Elphidium*** sp.

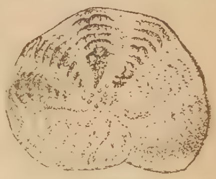
小形のもの，他の何れの種の幼少な形にも概當しない。

***Elphidium simaense*** n. sp.（第 2 圖）

4 つあり。其中美麗なる小形のものを模式に選定す。種の特徴を要約すれば下記の如くである。

殼はアンモン貝形，周縁は圓味あり，臍の附近は殆んど平たいか，或は少々凸出する。外見し得る室數は 8 乃至 9，縫合は僅かに曲走する。室は殆んで脹れなし。口孔は數多く細かくして最後室の前面に散布す。殼表の孔は粗大にして數少く，縫合部の横溝は他種に比し弱少で數も少い。最大なるものは長軸の直徑 0.37 mm に達し，模式では 0.32 mm で其短軸直徑は約 2/3 である。殼の厚さ 0.1 mm よりも可なり小さく大凡 0.07 mm 見當である。

本種の最も著しい特質は粗大な孔である。爲に一見 *Nonion* の様ではあるが，明かに *Elphidium* の特性を具備してゐる。他の種よりも小さいけれども標本が少いので良くは解らない。



第 2 圖 *Elphidium simaense* n. sp. type ×20)

***Bulimina simaensis*** n. sp.

太く短く，急に增大する。各室は圓味ありて卵形を呈し，形狀 *B. fijiensis* CUSHMAN, 1933 及 *B. echinata* d'ORBIGNY, 1826 に似てゐるが，殼頂部に細かい短小な針を持つ點に於て異る。其他 *Bulimina* の特質を具備し，奇なるものではない。模式は長さ 0.29 mm，幅 0.23 mm である。殼表の孔は比較的粗である。唯 4 つの標本あるのみ。なほ本種は渥美半島洪積統に多く出てゐるので詳細は後に記す筈。

***Bulimina*** sp.

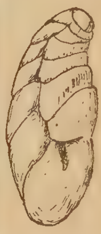
小さな唯 1 つの標本で我々には未知であるので同定を猶豫する。

***Geminospira simaensis*** n. gen. n. sp.（第 3–5 圖）

殼は稍螺狀を呈し特に小球型の幼部は螺旋し，平卷外卷であつて成熟部が綏卷に延びかゝつた形でありながら室は不完全に 2 列である。ロタリア形で背と腹の別あり，背腹に壓縮せる狀を示す。2 列の室列の內曲線の內側にある方は常に外側の室よりも小さく，數は少く，外側の室の稍腹縁を僅かに抱擁する。外側の最後室の前面には內側室との縫合に近く，それに直角に位置する溝が 1 つあり，屢々內側最後室の前面にも相對する位置に 1 溝を認む。口は此溝よりも腹よりに內外室縫合に沿ひ，大なる外側室の緣にある細長い切目をなしてある。長さ 0.5 mm 以下である。本種は最近渥美半島の洪積統にもあるを發見した。*Bulimina convoluta* WILLIAMSON, 1858 といふ珍しい種も本屬の他の例と思ふ。

第 3 圖 *geminospira simaensis* n. sp. type (Dorsal view) ×100

第 4 圖 同上 A paratype (Ventral view) ×100



第 5 圖 同 上 Aperture ×100

***Uvigerina*** cf. ***peregrina*** CUSHMAN

唯 1 つあり。淺野氏がかく假稱せるものに一

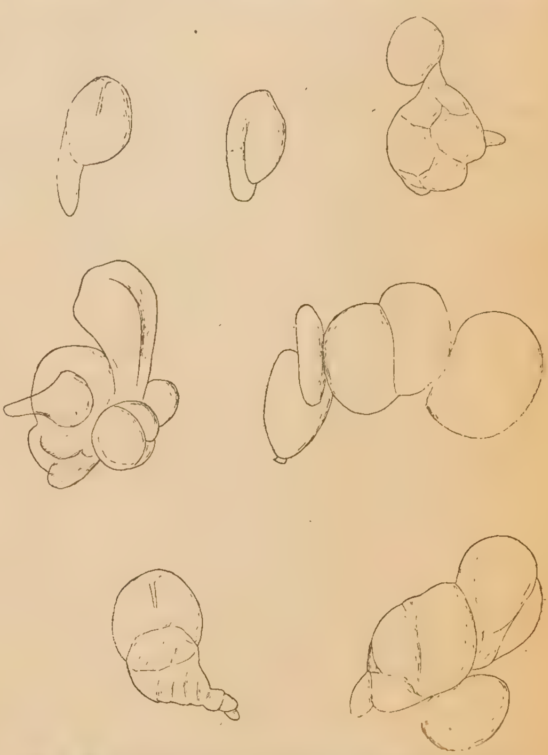
致す。即ち Bʀᴀᴅʏ が *U. pygmae* と *U. aculeata* の中間變種とするものである。

***Hopkinsina*** sp.

唯1つ破損せる個體あり。本屬の何れの種なるか定め難い。

***Oolitella irregularis*** n. gen. n. sp.（第 6 圖）

殼は不規則であり，形は種々で一定しない。各室は脹みがあり，稍卵形であるがやはり一定した形がない。新しい室の増加は何等規則なく添加するものの如くであり，其狀は蛇の卵の如くである。口には內管があるので *Entosolenia* に系統上近いと思ふ。斯くの如き奇異なる有孔蟲は未だ知られてゐない。



第 6 圖　*Oolitella irregularis* ×100　種々なる形を示す　左下のものを type とす

***Globigerina*** sp.

小さい形で表面に突起密生する。唯1つで破損してゐるので同定を預る。

***Globigerinoides triloba*** Rᴇᴜss, 1849.

前に槇山は本種を *G. cyclostoma* にあててゐたが，之は正しくないので此機會に訂正する。*G. cyclostoma* は圓口を持つ小さい種の樣であり，本種の中にも屢々圓い口のものがあるにはある。故に *G. cyclostoma* Gᴀʟʟᴏᴡᴀʏ and Wɪssʟᴇʀ 自體も一應吟味する必要がある。槇山がウキーンで採取し來た *G. triloba* と現在の標本は完全には一致しない。なほ本種は *Globigerina* よりも寧ろ其亞屬たる *Globigerinoides* に移すべきである。

***Globoratalia hispida*** MS.

唯1つあるだけであるので新種の發表を見合せる。從つて *G. hispida* は今の所先取權がない。圓みのある小さい種である。

以上の材料に就いて見るに此フォーナは要するに日本の南西部にある黑潮區の代表であり，之が貝類フォーナとの聯關は大炊御門經輝氏の記事により得べく，將來に於ける全般的調査の基準となる資料であると信ずる。

## Pleistocene Foraminifera from Sima, *Mie Prefecture.*

(Résumé)

By

Jirô Mᴀᴋɪʏᴀᴍᴀ and Tamotu Nᴀᴋᴀɢᴀᴡᴀ

Of the 80 species of *Foraminifera* listed above, notes on new species and some indeterminable forms are given in the Japanese lines, while the new genera would be interesting to micro-palaeontologists of all countries.

### *Geminospira* n. gen.

Type: *Geminospira simaensis* n. sp.

Test obscurely rotaliform, turreted, unequally compressed laterally; chambers incompletely biserial, inner chambers smaller and less in number than outer chambers; distal wall inflated, with a groove on the ventral side; aperture narrow, on inner border near suture; wall calcareous, finely perforate.

### *Geminospira simaensis* n. sp.

Test elongate oval, dorso-ventrally compressed, dorsal side flatly convex, ventral side more convex, periphery rounded; early chambers of microspheric form compactly coiled as in *Rotalia*, later uncoiled forming arcuate adult part, chambers in two rows, 8 to 11 outer chambers and 6 to 8 inner chambers, inner chambers smaller, lunate in cross section, a little embracing dorsal inflation of outer chamber; a few early inner chambers invisible from ventral side; sutures not much depressed, early outer sutures feebly limbate, early inner sutures slightly apressed; distal wall inflate, furnished with a groove on its ventral slope and just in front of the median suture extending in spiral direction; apertural slit on the inside border of the last outer chamber along the suture with the last inner chamber, not extending below the groove. Holotype: length, 0.52 mm., width, 0.24 mm. A paratype: length, 0.45 mm., thickness, 0.14 mm.

This species is apparently in relation with *Bulimina convoluta* WILLIAMSON, 1858 which seem to be another species of *Geminospira*. *Geminospira convoluta* from Torres Strait figured by BRADY shows oblique outer sutures and a zigzag median suture unlike the present new species. Moreover it differs from the latter in having more strongly coiled test and much wider inner chambers. In some specimens of *Geminospira simaensis*, the inner chambers are elongate and oblique to the median suture. It is not certain that this genus is allied with Buliminidæ, but it seems to have something common with *Cancris* and *Baggina*.

### *Oolitella* n. gen.

Type: *Oolitella irregularis* n. sp.

Test irregular, chambers usualy inflated, variable in form and size, without regular arrangement, first chamber tubular; wall thin, very finely perforate; aperture circular with an internal tube, free at the inner end.

### *Oolitella irregularis* n. sp.

Test very variable without a definite form; chambers up to 7, irregularly ovoid, not in spiral or linear arrangement, addition of a new chamber taking place upon any part of the earlier chamber; suture sometimes constricted; first chamber tubular, smaller than the rest; wall thin very finely perforate; aperture entosolenian; maximum long axis of chamber, 0.35 mm.

This very special form the Pleistocene of Sima is quite new to our knowledge. It is like *Adherentina* SPANDEL, 1909 and *Cayeuxina* GALLOWAY, 1933 in outline, but it is clear that they are not in relation. The young examples have some common characters with *Entosolenia* WILLIAMSON, 1858, such as in substance, fine perforation, aperture and interior tube. Monothalamous *Entosolenia* is said to be a later form of the complex phyletic lines of Buliminidæ. *Oolitella* may be a form a step later than *Entosolenia*, in which the early way of chamber arrangement has been missed.

# 北海道・樺太新生代植物の研究 VI.

## 北海道・樺太より産するスズカケノキ屬 (*Platanus*) 化石*¹⁾ (豫報)

理學博士 大石三郎
理學士 藤岡一男

(昭和 16 年 2 月 15 日講演, 2 月 25 日受理)

東亞產の *Platanus* 化石に就いては前に遠藤誠道博士の研究が有り, *P. aceroides* GOEPP., *P. Guillelmae* GOEPP., *P. sachalinensis* ENDO, *P. Heeri* LX. の 4 種を擧げ夫等の產地及び地質時代について詳細に述べられ, *Platanus* 屬は東亞に於いて新第三紀及び其以後の時代に屬する化石の未だ發見されないことゝ, 尙現生種の同定されるものが化石として存在しないことに就いて特に注意されてゐる。

筆者等は北海道・樺太の第三紀層より產した *Platanus* に就いて 5 種を檢出し得た。種名及び產地は第 1 表に示す。表中 *Platanus Heeri* は O. HEER 氏がソ領樺太ヅエ附近の白堊紀層より記載したもので, 邦領にはこの產出はない。

第 1 表　北海道・樺太 *Platanus* 化石產出表

| 時代及地層名<br>種名 | 白堊紀 | 第三紀 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 石狩期 | | | 浦幌期 | 川端期 | 追分期 | 瀧川期 |
| | ソ領樺太<br>ヅエ附近 | 北海道<br>石狩炭田<br>羊歯砂岩層 | 北海道<br>雨龍炭田<br>雨龍夾炭層 | 樺太<br>内淵夾炭層 | 北海道<br>釧勝炭田<br>尺別夾炭層 | 北海道<br>渡島半島<br>訓縫統<br>茅沼夾炭層 | | |
| *P. Heeri* | × | | | | | | 產出なし | 產出なし |
| Cfr. *P. aceroides latifolia* KN. | | × | | | | | | |
| *P. aceroides* GOEPP. | | × | × | × | × | | | |
| *P. Guillelmae* GOEPP. | | × | | × | × | × | | |
| *P. Mabutii* sp. nov. | | | | | × | | | |
| *P. sachalinensis* ENDÔ | | | | × | | | | |

*Platanus* の化石葉の分類は困難で, 現在 40 種を超える化石種中其の大部分は米國學者によつて命名されたもので, 米國の化石 *Platanus* の葉型の多樣性を認めるには充分であるが, 直ちに北米に於いてのみ特に多種存在したと考へるのは危險であらう。*Platanus* の化石葉は大別して次の 4 葉型群に分けられる。

葉の明に分裂するもの―
- 3 深裂, *P. racemosa* 型群
- 3 淺裂, *P. orientalis-P. occidentalis* 型群 (*P. aceroides* 型群)

葉の分裂せぬか又は極く僅に分裂狀を示すもの―*P. Guillelmae* 型群

葉は基部下に葉柄を蔽ひ前垂狀をなすもの―*P. bosilobata* 型群

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* Transactions of the Palaeontological Society of Japan, No. 124.

1) 第 1 報乃至第 5 報は北海道帝大理學部紀要に發表した.

この中 *P. basilobata* 型群は化石種のみで第三紀の上部にも知られてゐない。こゝで *P. Guillelmae* 型群のものは多種あるが，*P. aceroides* 型群と相伴つて産することが多く，種としては別なものでなく，*P. aceroides* 型群の中の種のうちの特殊の葉型を含んでゐるかも知れぬ疑は多分にあり，事實葉の分裂の程度は同一産地の化石葉や現生種の１本に於いても種々であつて其間の區別は出來ない。化石葉として最も産出の多いのはこの３淺裂—無分裂系で，その裂片の切込の性質，裂片の形狀,葉邊の鋸齒の性質，葉基脚の性質や葉全形等によつて種，變種が區別されてゐるが不自然なものが多い。筆者等は *P. Guillelmae* 型群はその中に種として獨立すべきものも有らうが，又同時に *P. aceroides* 型群のものとの區別困難な場合が多いので，*P. aceroides* 型群の亞型群としておく。

北海道•樺太産の化石中 *P. aceroides* GOEPP. と *P. Guillelmae* GOEPP. の産出が最も多く。大抵の場合兩葉型は相伴つて産出する。葉の大さ，形狀及性質は相當變化に富む。北海道の石狩炭田の羊齒砂岩層，雨龍炭田の雨龍夾炭層，釧勝炭田の尺別夾炭層及び樺太の內淵夾炭層に多産する。こゝに面白いことは上記各層は川端統及びそれより若い地層はなく，何れも始新—漸新世に屬するが,渡島半島の茅沼夾炭層より甚だ稀ながら *P. Guillelmae* GOEPP. が産出した。茅沼夾炭層は訓縫統に屬し中新世である。前に遠藤博士も指摘された樣に從來東亞の新第三紀層より *Platanus* の化石は知られなかつたのであるが，東亞に於いて中新世まで細々ながら存續した事がこれで明になつた。中新世の *Platanus* はこの外朝鮮の咸鏡北道の古乾原炭田の *Engelhardtia* 層から *P. Guillelmae* が極く稀ながら産してゐる。

*Platanus Mabutii* とした新種は釧勝炭田白糠郡の尺別夾炭層より産するもので，*P. basilobata* 型群に屬し，葉身が葉基部の下方葉柄の上を蔽ひ，この點 *P. sachalinensis* ENDÔ と似るのであるが,葉形は廣三角形をなし,葉邊は裂片をなさず波狀鋸齒を有す。*P. sachalinensis* とされた遠藤博士の標本は基部のみを示し葉の全形不明の爲比較が出來ない。從つてこの兩種は區別しておいた。

Cfr. *P. aceroides latifolia* KNOWLTON は北米ラトン層及びアラスカのユーコン川流域より産するものと酷似するが,非常に大形で殘念ながら我々の標本は全形を明にしない爲種の同定を控へた。本種は北海道の羊齒砂岩層より産する。

北海道•樺太の第三紀層に於いて幌內統及それ以前に於いては *Platanus* は多樣なる葉型を有し，夥しく産するが，幌內統後に於いては，未だ樺太に於いて實在を認めず，北海道に於いて訓縫統の茅沼夾炭層より稀に産するのみである。從つて少くとも中新世を以つて本屬は本域より姿を沒したものと思はれる。

**附記** 本報は近く北海道帝國大學理學部紀要に發表の豫定。

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## Studies on the Cenozoic Plants of Hokkaidô and Karahuto. VI. On the Tertiary *Platanus* from Hokkaidô and Karahuto.

## (Preliminary Report)

(Resumé)

By

Saburô ÔISHI and Kazuo HUZIOKA

More than 40 species (of which six are living) of *Platanus* are known in the world, the oldest known being the Cretaceous. They may tentatively be divided into four groups in respect to the

foliar characters: (1) *Racemosa* group, leaf deeply lobate, (2) *Aceroides-occidentalis-orientalis* group, leaf shallowly lobate, (3) *Guillelmae* group, leaf not lobate or obsoletely lobate, and (4) *Basilobata* group, leaf peltate. Of these groups, the foliar characters between (2) and (3) appear to merge gradually from one to another in many cases.

Among the Tertiary plants of Hokkaidô and Karahuto the present authors discriminated six different types as follows:

*P. aceroids* GOEPP.
  Isikarian Stage (Palaeogene).
    Hokkaidô: Woodwardia Sandstone of Central Hokkaidô;
      Uryû coal-bearing beds of the Uryû coal-field.
    Karahuto: Naibuti coal-bearing beds.
  Urahoroian Stage (Oligocene-Miocene).
    Hokkaidô: Syakubetu coal-bearing beds of eastern Hokkaidô.

*P. Guillelmae* GOEPP.
  Isikarian Stage.
    Hokkaidô: Woodwardia Sandstone.
    Karahuto: Naibuti coal-bearing beds.
  Urahoroian Stage.
    Syakubetu coal-bearing beds in eastern Hokkaidô.
  Kawabataian Stage (Miocene).
    Hokkaidô: Kayanuma coal-bearing beds of the Kunnui Series in southwestern Hokkaidô (as cfr. *P. Guillelmae*).

Cfr. *P. aceroides latifolia* KNOWLT.
  Isikarian Stage.
    Woodwardia Sandstone of Central Hokkaidô.

*P. Mabutii* sp. nov.
  Urahoroian Stage (Syakubetu coal-bearing beds).

*P. sachalinensis* ENDÔ.
  Isikarian Stage (Naibuti coal-bearing beds of Karahuto).

*P. Heeri* LESQ.
  Cretaceous (near Due coal mine, Russian Karahuto).

*P. aceroides* and *P. Guillelmae* are common and occur in association in most cases. Cfr. *P. Guillelmae* occurs from the Neogene beds of the Kayanuma coal mine, and this is the youngest record of fossil *Platanus* in the Asiatic continent (the authors recently recognized another Neogene *Platanus* from the *Engelhardtia*-bed of Tyôsen). *P. Mabutii* and *P. sachalinensis* are characterised by having peltate blade. Cfr. *P. aceroides latifolia* resembles the original specimen but is somewhat imperfect to admit precise comparison. *P. Heeri* has been recorded only from the Russian Karahuto but not known from Japan.

In Hokkaidô and Karahuto the development of *Platanus* began from the Cretaceous and it flourished most in the Palaeogene. It may be certain that it existed also in the early Neogene, but possibly disappeared since that time from these islands.

The details may be printed in the Journal of Faculty of Science, Hokkaidô Imperial University.

# 北海道・樺太新生代植物の研究 VII.

## 北海道・樺太第三紀層産ウリノキ屬 (*Marlea*=*Alangium*)*[1] (豫報)

理學博士 大石三郎
理學士 藤岡一男

(昭和 16 年 2 月 15 日講演, 2 月 25 日受理)

ウリノキ屬 (*Marlea* Roxb.=*Alangium* Lam.) の化石は未だ本邦は勿論東亞より報告されてゐない。然し本屬は東亞屬と稱してもよい植物で現在東亞に廣く且つ多種分布してゐる。即ち支那及南亞には *Alangium salviifolium* Wang. (香港・海南島), *A. Faberi* Oliv. (四川・廣西), *A. Kwangsiensis* Melch. (廣西), *A. Schweliense* W. W. Smith. (雲南), *A. Chinensis* (Lour.) (河南・江西・廣西・浙江・安徽・四川・雲南・貴州・福建・廣東・甘肅・東南アジヤ), *A. Kurzii* Craib. (海南島・香港・江蘇・湖北・安徽・廣西・浙江・タイ國・トンキン・ジヤバ), *A. rotundifolium* Bloemb. (河南・江西) 及び *A. platanifolium* Harms (江西・湖北・江蘇・四川) が分布する。

又日本列島・臺灣・朝鮮及滿洲には次に示す如く *Marlea platanifolia* と *M. chinensis* が廣く分布する[2]。

*Marlea platanifolia* Sieb. et Zucc. モミヂウリノキ・八角楓

  forma *macrophylla* (Sieb. et Zucc.) Wang. ウリノキ

    (=*M. macrophylla* S. et Z., *M. macrophylla* var. *trilobata* Nakai, *Alangium plataniphyllum* Harms var. *macrophyllum* Wang.) 北海道・本州・四國・九州・濟州島・朝鮮・滿洲

  forma *veltina* (Nakai) ビラウドウリノキ, 朝鮮

    (=*M. macrophylla* var. *veltina* Nakai)

  (forma *sinica* (Nakai) トウウリノキ・八角楓, 支那)

*Marlea chinensis* (Lour.) Druce 華瓜木, 南支・印度・馬來

    (=*M. begoniaefolia* Roxb., *Alangium begoniaeforium* Baill.)

  var. *nipponica* (Massam.) シマウリノキ

    (=*Alangium chinense* Lour. var. *nipponica* Massam., *Marlea premnifolia* Honda., *Alangium premnifolia* Owhi, *Marlea begoniaefolia* (Non Roxb.) 琉球・大島

  var. *taiwaniana* (Massam.) タイワンウリノキ

    (=*Alangium taiwanianum* Massam., *A. chinense* Rehd. var. *taiwanianum* Koidz.) 臺灣

1937 年 Potbury 氏は *Alangiophyllum* といふ新屬を創設した。これは California の La Porte flora (漸新世下部又は上部始新世)から產した「ウリノキ屬」の葉に似たものであるが, 葉が peltate form を有することと, 葉柄が構造上 stem 樣の性質を有することより新屬とされ, 目下 1 屬 1 種 (*A. petiocaulum* Potbury) である。

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* Transactions of the Palaeontological Society of Japan, No. 125.

1) 第 1 報乃至第 5 報は北海道帝大理學部紀要に發表した.

2) 學名は支那・南亞のものは Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem, Bd. X, 1930, S. 822 及び Engler: Botanische Jahrbücher, Bd. 71, Ht. 2, 1940, S. 169 により, 日本のものは小泉源一博士の御敎示を仰いだ.

1939 年 Kryshtofovich 氏及 Borsuk 氏は *Ficus tiliaefolia* (Al. Br.) Heer と *Büthneria aequalifolia* (Goepp.) Meyer とを一括して「ウリノキ屬」に含め *Alangium aequalifolium* (Goepp.) Kryshtofovich et Borsuk n. comb. とした。兩氏のこの着眼は非常によいのであるが，これには未だ問題が有り，こう簡單には行かぬと思ふ。即ち Heer 氏が *Ficus tiliaefolia* として記載した原標本の化石葉の大部分は兩氏の云ふ様に *Ficus* といふよりは *Alangium* (=*Marlea*) にする方が自然であり，又 *Büttneria aequalifolia* と Kräusel 及 Meyer 兩氏が呼んでゐる化石葉は現生 *B. integrifolia* や *B. aspera* に似てゐるが，同時に *Alangium rotundifolium* にも非常によく似るので，これ又兩氏の云ふ如く *Alangium* と稱するのは全然不當とは言はないが，この兩化石種を同一種とする事には贊成出來ない。更に又この兩種名は實に混雜して用ゐられ，恰も歐亞の第三紀植物化石の掌狀脈を有する全緣葉の集合名稱の感があり，屬名の變更をするとしても其の標式を示さなければ混亂を救ふことは出來ない。樺太の惠須取夾炭層々位，北海道北部の川端期植物化石層より *Büttneria aequalifolia* に同定される化石葉は夥しく產する。これについては更に現生種と精細に比較檢討して別に述べるつもりである。

註 *Ficus tiliaefolia* と *Büttneria aequalifolia* の名稱を古く遡つて檢討すると，根本は Alex Brown 氏が 1845 年スイスの Oeningen より植物化石を報告した時 *Cordia tiliaefolia* Al. Br. として無圖にて而も簡單な記載を發表したのがもとで，1850 年 Unger 氏がこの *Cordia tiliaefolia* と一緒に報告された *Tilia prisca* Al. Br. とを一諸にして *Dombeyopsis tiliaefolia* (Al. Br.) Unger と改め，同時に *D. grandifolia* Ung. を記載した。其後 1852 年 Goeppert 氏が Schossnitz の上部中新世より *Dombeyopsis aequalifolia* Goepp. を記載した。ところが 1856 年 O. Heer 氏は *Cordia tiliaefolia* Al. Br., 1845; *Tilia prisca* Al. Br., 1845; *Dombeyopsis tiliaefolia* (Al. Br.) Unger, 1850; *D. grandifolia* Unger, 1850 及び *D. Stizenbergeri* 等を一括して *Ficus tiliaefolia* (Al. Br.) Heer, 1856 と改めた。しかるに 1919 年 Fr. Meyer 氏は *D. tiliaefolia* (Al. Br.) Unger, 1850; *D. grandifolia* Unger, 1850 及び *D. aequalifolia* Goepp., 1852 を一括して *Büttneria aequalifolia* (Goepp.) Fr. Meyer に改めた。以上の様に屬種名は複雜に變遷したが，Heer 氏の *Ficus tiliaefolia* と Meyer 氏の *Büttneria aequalifolia* は相似て相異つた葉型を代表してゐる。しかるに多くの著者はこの兩種名を各自に勝手に運用し甚だしく混雜させた。ところを Kryshtofovich と Borsuk 兩氏がこの兩者を引括めて *Alangium aequalifolium* (Goepp.) として了つた。正しくは *A. tiliaefolium* (Ai. Br) と稱しなければならないのである。よつてこれは Heer 氏と Meyer 氏の標式型について屬種名を決定し，從來の報告を整理する事が必要であると思ふ。

筆者等がこゝに報告する化石「ウリノキ」屬は何れも葉の印象によるもので，種名と產地は第 1 表に示す如く，すでに石狩期の上部に本屬と思はれる植物が存在し，少くとも川端期には樺太にも在つたことが知られる。これ等は何れも現生種に甚だよく以てゐる。即ち現生種の *Marlea platanifolia* 型に類像を有するものは *M. basitruncata* sp. nov., *M. kusiroensis* sp. nov. 及び *M. taiheiensis* sp. nov. の 3 種で，北海道石狩炭田の羊齒砂岩層，釧勝炭田の尺別夾炭層及び樺太の惠

第 1 表 北海道・樺太產化石 *Marlea* 屬

| 種 名 | 產 出 層 名 | 時 代 |
|---|---|---|
| *M. basiobliqua* sp. nov. | 北海道石狩炭田羊齒砂岩層 | 石 狩 期 |
| *M. basitruncata* sp. nov. | 同 上 | |
| *M. kusiroensis* sp. nov. | 北海道釧勝炭田尺別夾炭層 | 浦 幌 期 |
| *M. taihéiensis* sp. nov. | 樺太惠須取炭田惠須取夾炭層 | 川 端 期 |

須取夾炭層より産する。本型の現生種は温—暖帶の廣範圍にわたり，現在北海道の北見を以つて日本の分布の北限とするから，之等化石種の指示する氣候も大低現在の氣候から見て北海道及び其以南に相當する事が考へられる。又 *M. chinensis* 型のものは *M. basiobliqua* sp. nov. のみで，これは，北海道石狩炭田羊齒砂岩層のみに多産する。本型は現在暖—亞熱帶に分布するもので，日本に於いては九州南端部を分布の北限とし，本型化石の産出は少くとも暖帶氣候を示唆するものと見られる。

**附記** 本報は近く北海道帝國大學理學部紀要に發表の豫定。

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# Studies on the Cenozoic Plants of Hokkaidô and Karahuto. VII.

## On the Tertiary *Marlea* (=*Alangium*) from Hokkaidô and Karahuto. (Preliminary Report)

(Resumé)

By

Saburô Ôishi and Kazuo Huzioka

There are about eight living species of *Marlea* (=*Alangium*) distributing in Japan, Manchoukuo, China, and palaeotropical region of southeastern Asia. Of these, *M. platanifolia* Sieb. and Zucc. and *M. chinensis* Rehder are living in the Japanese Islands, the northern most limit of the former being Prov. Kitami (N.L. 45°) of Hokkaidô, while the latter the southern Kyusyû (N.L. 32°).

The authors recognized four different types of fossil *Marlea* from the Tertiary rocks of Hokkaidô and Karahuto. They are *M. basitruncata* sp. nov., *M. kusiroensis* sp. nov., *M. taiheiensis* sp. nov. and *M. basiobliqua* sp. nov. The former three are the type of modern *M. platanifolia*, while the last one is the type similar to *M. chinensis*. *M. basitruncata* and *M. basiobliqua* have been derived from the Woodwardia Sandstone of the Isikari Series of Hokkaidô (Isikarian Stage; Palaeogene), *M. kusiroensis* from the Syakubetu coal-bearing beds of the Urahoro Series of Hokkaidô (Urahorian Stage; Oligocene-Miocene) and *M. taiheiensis* from the Esutoru coal-bearing beds of Karahuto (Kawabataian Stage; Miocene).

In 1939, Kryshtofovich and Borsuk brought *Ficus tiliaefolia* (Al Br.) Heer and *Büttneria aequalifolia* (Goepp.) Meyer into one species and adopted the generic name *Alangium* taking the latter specific name. The present authors agree with these Russian authors in that the genus *Alangium* (=*Marlea*) is the more adequate generic designation for the named fossil types, yet the present authors bear a different opinion in bringing them into one specific type. Types referable to "*Büttneria aequalifolia*" are rather common in the Kawabataian flora of Hokkaidô and Karahuto, but the comparison with the living types bearing similar foliar characters is now carrying on.

The details may be printed in the Journal of Faculty of Science, Hokkaidô Imperial University.

# *On the Discovery of Phacops (s. s.) from the Nakazato Series (Middle Devonian) of the Kitakami Mountainland, Japan**

By

**Toshio Sugiyama and Hirosi Okano**

(Read February 15 th, received April 2 nd, 1941.)

Remains of trilobites are exceedingly rare in the Japanese palaeozoic, and there

Table 1. The succession of the palaeozoic strata in the southern Kitakami Mountainland, previously published by the senior author is as follows:

| | Geological age | Formation | Characters |
|---|---|---|---|
| Permian | Kazanian ?<br>↕<br>Sakmarian | Toyoma series | Slate, fossils rare. |
| | | Maiya series | Slate, sandstone, conglomerate and limestone; limstone dominant in the lower part. Fossils: Fusulinids, brachiopods, bryozoa, corals, trilobites, calcareous algae, etc. |
| Carboniferous | Moskovian<br>↕<br>Visean | Onimaru series | Heavy bedded slate and limestone in alternation, with schalstein in the upper part. Fossils: Corals, brachiopods, etc. |
| | Tournaisian | Tyôanzi series | Trachytic tuff, slate, sandstone and limestone; very fossiliferous in the lower part. Fossils: Brachiopods, corals, bryozoa, trilobites, ammonites, etc. |
| Devonian | Etreungtian<br>↕<br>Gedinnian | Ômori series | Fine grained trachytic tuff, more or less conglomeratic in the basal part; particularly fossiliferous in the upper part. Fossils: Trilobites, brachiopods, bryozoa, etc. |
| | | Nakazato series | Trachytic tuff, with conglomerate in the basal part, fossiliferous in the upper part. Fossils: Brachiopods, trilobites, radiolaria, etc. |
| | | Ôno series | Partly green adinole and partly siliceous slate, with a limestone in the basal part which is very fossiliferous. Fossils: Corals, crinoids, stromatoporoids, radiolaria, etc. |
| Gotlandian | Downtonian<br>↕<br>Salopian | Takainari series | Chiefly green adinole, with reddish purple radiolarian slate in the basal part. Fossils: Radiolaria. |
| | | Kawauti series | Heavy bedded limestone and phyllitic slate in alternation, limestone very dominant in the lower part and very fossiliferous. Fossils: Stromatoporoids, corals, bryozoa, calcareous algae, trilobites, brachiopods, etc. |

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* Transactions of the Palaeontological Society of Japan, No. 126.

are a few records of some pygidia provisionally identified to *Phillipisa*1) (sens.ext.) found in the Permian Maiya series of the southern Kitakami Mountainland and the contemporaneous deposits of the Abukuma Mountainland. The palaeontological and stratigraphical works by the former and present members of the Institute of Geology and Palaeontology, Tôhoku Imperial University in the southern Kitakami Mountainland, have recently greatly extended the geological distribution of trilobites, and their remains are now known from at least four other different horizons, Kawauti, Nakazato, Ômori, and Tyôanzi series. In the upper part of the Ômori series trilobite-remains are particularly abundant and some of them are fairly well preserved.

The present material was collected a few years ago by the senior author during his field work in the southern Kitakami Mountainland, from the Nakazato series, the precise locality being the south-west slope of Takainari-yama in the Kesen district, Iwate-ken. It consists of an incomplete cephalon and a left eye both belonging, without doubt, to the same species and bearing features the characteristic of the genus *Phacops* (s. s.) which has been established by H. F. Emmrich2) in 1839 on *Phacops latifrons* Brongniart from the Devonian of Bohemia.

*Phacops* (s. s.) is a characteristic trilobite of the Devonian and upper Gotlandian and more than 40 species have been recorded from the world, in so far as known from the literature consulted. Many species of this genus are from Europe and North America, while only a few being known from the southern hemisphere. During the thirty years past, this genus has been repeatedly reviewed by F. R. C. Reed3), R. Wedekind4), Rudolph and Emma Richter5), D. M. Delo6), and others, and its generic status was made clear by the thorouth revisions by Richter in 1926, Reed in 1927, and Delo in 1935. The Asiatic species of *Phacops* (s. s.) are shown in the table 2.

As shown in the table 2, all the known species occur from the Devonian. The Nakazato series from which the Japenese material now at hand has been derived is also Devonian in age, and the occurrence of the genus in Japan is the first record and is particularly interesting from the view of its geographical distribution in the world.

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1) I. Hayasaka: Some Permian Fossils from the Kitakami Mountainland. Jap. Jour. Geol. Geogr., Vol. II, No. 4, p. 113, 1923.
T. Nagao: New Locality of Trilobites. Jour. Geol. Soc. Tôkyo, Vol. 38, p. 255, 1931.

2) H. F. Emmrich: De Trilobitis. Disseration Petrefactologica. 1839. (cited after Richter's Fossilium Catalogus. Animalia. Trilobitae neodevonici. p. 75, 1928.)

3) F. R. C. Reed: Recent Work on the Phacopidae. Geol. Mag., Whole Ser., Vol. 64, pp. 308–322, 1927.

4) R. Wedekind: Klassifikation der Phacopiden. Zeitsch. Deutsch. Gesell., Bd. 63, pp. 317-336, 1911.

5) Rudolph and Emma Richter: Die Trilobites des Oberdevon. Preuss. Geol. Landesanstalt N. F. Ht., 99, pp. 126–211, 1926.

6) D. M. Delo: A Revision of the Phacopid Trilobites. Jour. Palaeont., Vol. 9, No. 5, pp. 402–423, 1935.

Table 2.

1. *Phacops* aff. *latifrons* BRONGNIART. Upper Devonian. Koragh Ridge, Chitral, India1).
2. *Phacops* sp. Upper Devonian. Koragh Ridge, Chitral, India2).
3. *Phacops latifrons* nov. var. Middle Devonian. Padaukpin. North Shan State, Burma3).
4. *Phacops shanensis* REED. Lower Devonian ? Zebingyi, Shan State, Burma4).
5. *Phacops latifrons* BRONGNIART ? Devonian. Iran (Persia)5).
*6. *Phacops latifrons* BRONGNIART. Devonian. North of Damgha, Iran (Persia)6).
7. *Phacops altaicus* TSCHERNYSCHEW. Upper part of Lower Devonian. South-western part of the Altai Mountainland7).
8. *Phacops* sp. Middle Devonian. Beja River in the Minussinsk, Siberia8).
*9. *Phacops feccundus* BARRANDE var. nov. Middle Devonian. T'angpiao Tsun, Linshan-hsien, Kuantung9).

* Those marked with an asterisk are appeared in the cited publication, but were given no description or illustration.

## *Phacops* (s. s.) sp. indet.

Text-figs. 1—3 a

Cephalon very fragmental and strongly deformed, hemispherical ? in general outline when restored, anterior margin arcuate and 25 mm high at the axial part of glabella.

Glabella imperfect, large, subpentagonal ?, considerly inflated ?, measuring 20 mm in maximum height with a pair of very indistinct lateral furrows near base ; whole surface tuberculated, tubercles become more or less larger in size toward front, rather uniformly distributed over whole surface, round or oval in general outline, 0.5–1 mm in diameter on an average. The one exceedingly large prominance on the left side of the frontal part of glabella is surely of accidental origin, and not a proper character.

Palpebral lobe on left side of cephalon preserved, considerably elevated and well marked from palpebrum. Eye large, prominent, inclined outward, hemispherical in outline, occupying nearly whole area of free cheek, 9 mm broad and 11 mm long ; separated from glabella by a rather narrow but distinct furrow, composed of rounded lenses which are 0.5 mm in diameter on an average, arranged in 17 rows, 5–11 lenses being counted respectively in each row, the total number of them amount to 157 ; their arrangement and number of lenses in each row is as shown in the table 3 (counted from anterior side) : Characters of racial sutures, genal angle and nack ring quite unknown.

Table 3.

| Rows | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of lenses | 8 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 10 | 10 | 9 | 9 | 7 | 5 |

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1) F. R. C. Reed : Devonian Fossils from Chitral and the Pamirs. Palaeontol. Indica, N. S., Vol. 6, No. 2, p. 76, pl. 13, figs. 1, 1a, 2, 1922.

2) F. R. C. Reed : Op. cit.

3) F. R. C. Reed : The Devonian Faunas of the Northern Shan States. Palaeontol. Indica, N. S., Vol. 2, No. 5, p. 132, pl. 17, figs. 15-25, 1908.

4) F. R. C. Reed : Op. cit.

5) F. Frech : Ueber palaeozoische Faunen aus Asien und Nord-afrika, Neu. Jahr. min. Geol. u. Palaeont., Vol. II, p. 62, 1895.

6) F. G. Clapp : Geology of Eastern Iran. Bull. Geol. Soc. America, Vol. 51, No. 1, p. 29, 1940.

7) T. Tschernyschew : Materialien zur Kentniss der Faunen des Altai. Verh. russ. kais. Min. Gesell. St. Petersburg., Ser. 2, Bd. 30, 1893.

8) A. Stuckenberg : Materialien zur Kentniss der Faunen der devonische Ablagerungen. Mem. Acad. Imp. Sc. St. Petersburg, Vol. 2, No. 1, 1886.

9) A. W. Grabau : Problems in Chinese Stratigraphy. Sci. Quart. Nat. Univ. Peking, Vol. 2, No. 2, p. 217, 1931.

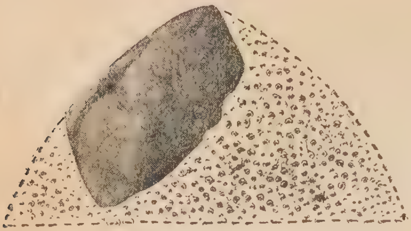

Fig. 1. Dorsal view of an incomplete cephalon ; x 1.

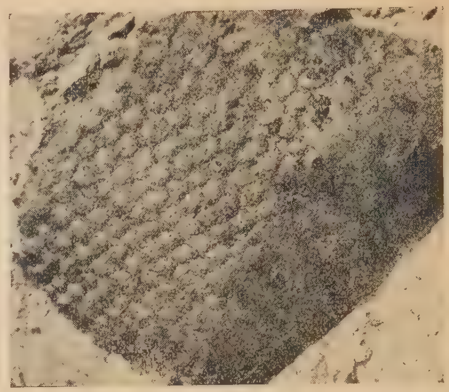

Fig. 2a. Ditto, enlarged ; x 5.

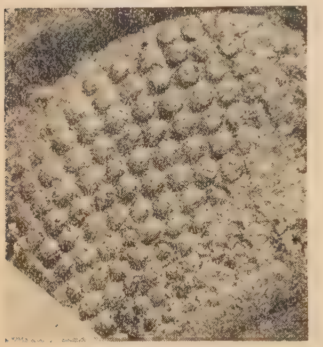

Fig. 1a. A part of an eye in the left side of the same specimen enlarged ; x 5.

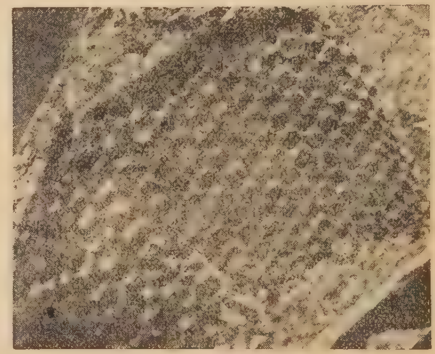

Fig. 3à. Ditto, enlarged ; x 5.

Fig. 2. A part of another eye in left side of different specimen ; x 1.

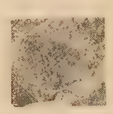

Fig. 3. Impression of the same specimen ; x 1.

Kumagai photo

As stated above, the present material is characterised by having large schizochroal eyes, and tubercurated glabella with very indistinct lateral furrows; all these features are marked serving to remove its alliance from genera such as *Reedopsis, Eocryphops, Cryphops, Trimerocephalus, Nephranops, Dianops, Bouleia* and others in the Phacopinae. In having large schizochroal eyes, it considerably approaches *Dalmanites*, but the latter has the glabella with distinct lateral furrows. Of the abundant species of *Phacops* (s. s.), *Phacops latifrons*, the type of the genus, bears many characters in common with the Japanese form, but the latter is easily distinguishable from the former by having a large number of lenses in the eyes. In *latifrons*, the lenses are arranged in rows numbering up to 18, and amount in general to 77-90, at most 120 in the total number, while in the Japanese material there are 157 lenses arranged in 17 rows. In trilobites, however, the number of lenses in eyes is generally said to show a considerable variation in different individuals of the same species; especially it is far less in the young than in the adult. But as stated above, the difference recognizable in the number of lenses of eyes between the Japenese material and *latifrons* is too great to be look upon as mere variation within the same species. The former is therefore perhaps referable to a new form of *Phacops* (s. s.) closely allied to the latter. However, owing to the scanty and fragmental material, the erection of new specific name is at present avoided.

Locality: At the south-western foot of Takainari-yama, Kesen-gun, Iwate-ken. Reg. No. 64549.

Finally, we wish to express our warmest thanks to Dr. H. Yabe, Prof. Em. of the Tôhoku Imperial University to whom we are much indebted in the preparation of this short paper and to Mr. K. Hatai of the Institute of Geology and Palaeontology, Tôhoku Imperial University for reading the manuscript.

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## 北上山地中里統（中部泥盆紀）産の*Phacops* (s. s.) に就いて（摘要）

杉山敏郎・岡野寛

本邦には三葉蟲類の尾部が北上及び阿武隈兩山地の二疊紀から夫々知られ，大體廣義の *Phillipsia* に同定せられてゐた。最近此外に石炭紀・泥盆紀及びゴトランド紀層からも夫々發見せらるゝに至つた。本報告では北上の中里統から産出した *Phacops* の尾部の記載をした。この標本は狭義の *Phacops* に同定され，殊に *P. latifrons* に酷似する諸性質を帶びてゐる。この泥盆紀産の三葉蟲の報告は本邦では初めてである。

### *Miscellaneous Notes on the Cambro-Ordovician Geology and Palaeontology I.*

# *Occurrence of the Kushan Trilobites in Northern Anhui and a Note on the Rakuroan Complex of the Shankiangan Basin**

By

**Teiichi Kobayashi**

(Received May 6th; read May 24th, 1941.)

1) *Occurrence of the Kushan Trilobite in Anhui*:—While studies on the Cambrian stratigraphy and palaeontology are fairly well advanced in eastern North China, South Manchuria, Chosen and the border land between South China and Indochina, our knowledge is still meager in the remaining parts of Eastern Asia, and in such territories even sundry facts are worth noting. Recently Dr. T. Tokuda of the Mitsui Mining Company obtained a slab contaning a few trilobite fragments at Chieu-lung-kang, Huai-nan, Anhui[1], and submitted it to me for study for which courtesy I am deeply grateful. The slab is a gray earthy marl, the weathered surface of which is of yellowish colour, and contains three species of trilobites as follows:

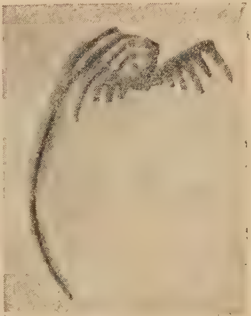

Fig. 1

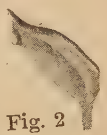

Fig. 2

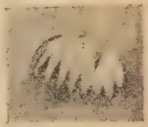

Fig. 3

Fig. 1. *Blackwelderia monkei* ×2
Fig. 2. *Drepanura premesnili* ×1
Fig. 3. *Teinistion lansi* ×1

A pygidium of *Blackwelderia monkei* (Walcott)
A free cheek of *Drepanura premesnili* Monke
A pygidium of *Teinistion lansi* (Monke)

In the pygidium of the first species the first lateral spine is unusually long, extending postero-laterally but curved inward in the posterior portion, but otherwise all the features are typical of the species. It somewhat resembles the pygidium of *Drepanura ketteleri* but the axis is much narrower and the anterior margin is more rounded. The anterior position and the small size of the eye in the cheek of the second species suggest that it belongs to *Drepanura premesnili* rather than to *D. ketteleri*. Its lateral rim is remarkably elevated and thickened in the anterior, and fine subparallel lines are found on it. Its cheek inside of the rim is smooth whereas this part is granulated in *D. ketteleri*. As the genal portion is not presserved, whether it has a genal spine cannot exactly be determined. For a detailed description of this species the reader is referred to a recent paper of mine[1]. The pygidium of the third species is broad and has a narrow axis which is elevated above the flat pleural lobes. Six pairs of flat spines are found on the border among which the outermost one is the longest and the innermost the broadest. Judging from these features it best agrees with the pygidium which MONKE referred to *Teinistion lansi*.

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* Transactions of the Palaeontological Society of Japan, No. 127.

1) 安徽省淮南九龍崗.

All of these fossils are characteristic menbers of the Kushan fauna and the rock containing them shows an aspect typical of the so-called Kushan shale. Therefore it is quite certain that the slab was obtained from the Kushan formation although the Cambro-Ordovician succession of the Huai-nan district is unknown.

2) *The Cambrian Fossil Zones in the Tingyuan-Fengyan Region*:—The best Cambrian succession in the Northern Anhui was determined in the Tingyuan-Fengyan (定遠•鳳陽) region by W. T. CHANG and C. LI, and its summary is given in GRABAU's "Palaeozoic Formations in the Light of the Pulsation Theory, vol. 3". It consists of five formations and five fossil zones as follows:

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|---|---|
| V. Leechiachuan formation (100 m.) | 5. *Mansuyia orientalis* zone |
| IV. Miashan formation (150 m.) | |
| III. Dachiling red sandstone (4 m.) | |
| II. Shaochin formation (200 m.) | 4. *Kootenia asiatica* zone<br>3. *Ptychoparia tuberculata* zone |
| I. Heishiling formation (300 m.) | 2. *Redlichia nobilis* zone<br>1. *Redlichia angulata* zone |

Although I have not as yet seen CHANG's palaeontological peper, it is certain that the lowest formation belongs to the Shora stage as *Redlichia* is contained. *Ptychoparia tuberculata* is a new species but the zone containing ptychoparids may be referred to the Shihchiao if not to the Tangshih stage. The next zone yields *Kootenia asiatica*, *K. punctata*, *K. anhwiensis*, *Emmerichella laevigata*, and *Anomocarella rectangulata*. Among them *Kootenia punctata* is the species first described by myself[2] from the *Olenoides* zone of Neietsu in South Chosen and a recent study on the geology of the Neietsu district by I. YOSIMURA[3] showed that the zone is located in the lower portion of his Machari formation. As noted already the fauna of the *Olenoides* zone is intimately related to the Stephen fauna in North America. Although WALCOTT[4] correlated the Kushan with the Stephen fauna the two faunas are in fact quite different. Likewise the *Olenoides* fauna of South Chosen is certainly distinct from the Kushan one. In the upper part of the Machari formation there are the *Lopnorites* and *Olenus* zones but the Kushan stage has not as yet been discovered. Although more study is needed before we can say anything definite on the matter, I am inclined to believe that the *Olenoides* zone belongs roughly to the Taitzu stage. On the other hand it is certain that *Kootenia asiatica* is a trilobite much older than *K. punctata*. I found *K. asiatica* in a limestone boulder in a hill north of Chuwa which is exclusively composed of *Redlichia* shales. However, because the *Kootenia* zone is located above the *Ptychoparia tuberculata* zone in the section of Northern Anhui it may not be older than Tangshih. The youngest in the section is the *Mansuyia orientalis* zone which belongs to the Taishan stage.

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[1] T. KOBAYASHI: (1941), Studies on Cambrian Trilobite Genera and Families (I-III). Japan. Jour. Geol. Geogr., Vol. 18.

[2] T. KOBAYASHI: (1935), The Cambro-Ordovician Formations and Faunas of South Chosen. Pt. 3. Jour. Fac. Sci., Imp. Univ. Tokyo, sect. 2, vol. 4, pt. 2.

[3] I. YOSIMURA: (1940), Geology of the Neietu District, Kogendô, Tyosen. Jour. Geol. Soc. Japan, vol. 47.

[4] C. D. WALCOTT: (1913), Cambrian Faunas of China.

Unconformities are said to exist between the Heishiling and Shanchin formations and between the Dachiling and the Miashan farmations. Judging from these fosssil zones, however, time-gap between the *Redlichia* and *Ptychoparia* zones is not as great as that between the *Kootenia* and *Mansuyia* zones where the fossil zones of the Paishan and Kushan stages are missing. The stratigraphical break, however, ought to be determined not only by fossils but by field-evidence, and the finding of the three fossils above mentioned indicates that the Kushan stage is present at least in the Huai-nan area in the same province.

3) *The Cambro-Ordovician Formations in the Northern Anhui and Northern Kiangsu*:—In Explanation to Nanking-Kaifeng Sheet-Map Li[1] gave a statement as follows:

> "The Cambrian strata are well developed in the regions north of the Huaiyang-shan (淮陽山) range, especially in parts of the districts in southern Shantung where they often form high mountains and ranges with the thickness of about 700 m. In the Tungshan (銅山) and Hsiaohsien (蕭縣) districts, Kiangsu, and the Suhsien (宿縣) district, Anhuei, the lower and middle parts amount to more than 300 m. in thickness, whereas the upper part is estimated at only about 100 m. In the Huaiyuan (懷遠) and Fengyang (鳳陽) districts, Anhuei, the lower part being with gray and green shale and sandy shale with a thickness of about 50 m., upon which rests the red micaceous shale, the total thickness amounting to about 150 m.; the middle part comprises oolitic limestone with thinbedded limestone with the thickness of only 50-60 m.; the upper part is composed of gray limestone and conglomeratic limestone and estimated at about 100 m. In the Shouhsien (壽縣) district the Cambrian strata amount to only about 300 m. in total thickness, the red shale of the lower part being more developed. Finally in the Kuoyang (渦陽) and Mengcheng (蒙城) districts the Cambrian strata very much decrease in thickness and is estimated at only several tens of meter."

In the Geology of Kiangsu Liu and Chao[2] give 210 m., 265 m., 195 m., and 450 m. for the average thickness of the Manto, oolitic limestone, Chaumitien and Tsinan series respectively. There are isolated hills to the south of the Shantung block. The Cambro-Ordovician succession in the Tungshan (銅山) district in Northern Kiangsu determined by Hsieh[3] and emended by Lee[4] is as below:

6. *Actinoceras* bearing Machiakou limestone, 350 m. thick; bluish gray limestone, thin-bedded in the lower and massive and rich in flint in the upper part where actinoceroids are scattered.
5. Chiawang (賈汪) shale, 10–15 m. thick; yellow or ochreous shale or shaly limestone.
4. Sanshantzu (三山子) limestone, 300–500 m. thick; gray or white crystalline limestone, highly silicified in the upper part, becoming pure blue limestone towards the base. A

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[1] C. Li: (1929), Geological Map of China, Nanking-Keifeng Sheet and its Explanatoy Text.

[2] C. C. Liu and Y. T. Chao: (1924), Preliminary Report on the Geology and Mineral Resources of Kiangsu. Mem. Geol. Surv. China, ser. A, no. 4.

[3] C. Y. Hsieh: (1932), The Chiawang Coal Field of Tungshan District, Kiangsu Province. Bull. Geol. Surv. China, no. 18.

[4] J. S. Lee: (1939), The Geology of China. London.

reddish limestone conglomerate occurs at the base at some places.

3. Thin-bedded limestone, 200 m. thick; ash-gray, partly shaly, locally crystalline and conglomeratic; wurmkalk frequently intercalated.
2. Oolitic limestone, 260 m. thick; thin-bedded and dark brown in colour.
1. Lower Cambrian Manto shale, 210 m.; red sandstone and shale with numerous thin beds of limestone.

In this section the Machiakou limestone is disconformably overlatin by the Moscovian Tsüanwangtou (泉汪頭) limestone. In the northern hills of Su-hsien (宿縣), N. Kiangsu, WONG and CHI[1] observed the Cambrian of 550 metres' thickness and the Ordovician formation of 400 metres' thickness. The lower part of the Cambrian is composed mainly of variegated shales and sandstones and the Wurmkalk appears in the upper part. The section they observed probably extends from the Middle Cambrian to the Ordovician.

WANG's Cambro-Ordovician section of Huaiyuan-hsien (懷遠縣)[2] is, although his description is brief, interesting in that it shows the sandstone layers to exist below the lower Ordovician crystalline limestone and the Wurmkalk is apparently absent. The Sinian Nankou limestone is overlain by the Cambrian red shale and oolitic limestone, 690 m. thick, and then comes the Ordovician gray limestone, 483 m. thick, which is overlain by the Permo-Carboniferous coal series. Glancing over these facts the Cambro-Ordovician succession of the region is not much different from that of western Shantung.

4) *The Sinian System in Northern Anhui, Northern Kiangsu and Western Shantung*:—The Sinian system is so poorly represented in the northern part of western Shantung block that BLACKWELDER neglected it. But it is fairly extensive and thick in the southern part of Shantung. YAMANE[3], in his geological reconnaissance en route from Tsinan (濟南) to Tsingchow-fu or Ching-chow (青州府) through I-chou (沂州), met with the Sinian quartzite series lying below the Manto formation to the north of I-chou, where it is composed of alternations of greyish white quartzite and green shale in addition to a few thin layers of the limestone. This pre-Cambrian formation is called here the I-chou series. In his geological exploration WATANABE also observed a similar quartzite of a considerable thickness beneath the Manto in the northern hills between Lin-cheng (臨城) and I-hsien (沂縣). According to YAMANE the series is 260 m. in thickness at Chin-chu-shan (金猪山), near Yen-tuan (硯疃), northeast of I-chou, but absent at Pai-ta (白塔) between I-shuei (沂水) and Chingchow (青州府). In the northern part of Shantung WATANABE[4] found a thin quartzite layer 10 m. thick beneath the Manto shale at Fangtzu (坊子), but at Poshan (博山) the Manto directly overlies the basement of Archaean gneiss. In

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1) W. H. WONG and Y. S. CHI: (1932), The Lieshan (烈山) and Luichiakou (雷家溝) Coal-field of Suhsien, Northern Anhui. Bull. Geol. Surv. China, no. 18.

2) C. C. WANG: (1924), The Coal Fields of the Southwest Part of Huai Yüan Hsien, Anhui. Bull. Geol. Surv. China, no. 6.

3) S. YAMANE: (1921-22), Through Shantung, China. Jour. Geogr. Tokyo, vols. 33-34.

4) K. WATANABE: (1923), Through Shantung, China. Jour. Geogr. Tokyo, vol. 35.

Explanation to Peking-Tsinan Sheet Tan[1] gave a brief account.

"The quartzite formation overlies the Taishan complex and is 50-200 m. thick; the siliceous limestone exsists between the Taishan complex and the Cambrian strata but is only a very few to 90 m. thick."

As to the southern extension of the Sinian System Li[2] states in Explanation to Nanking-Kaifeng Sheet as follows:

"The Sinian system rests unconformably upon the Wutai system and includes two parts between which there occurs a disconformity, the lower part being composed chiefly of quartzite and the upper part of limestone. In the Feng-yang (鳳陽) district, Anhuei, the lower part comprises reddish and white quartzites and amounts to about 150 m. in thickness, the upper part contains largely the limestone which is mostly converted through intense metamorphism into yellow and white marble, with a thickness of from 120 m. up to more than 400 m. At Feng-huang-shan (鳳凰山) in the Ling-pi (靈壁) district, the limestone becomes silicified and includes siliceous bands or layers." And "the Huochiu (霍邱), Shou-hsien (壽縣) and Meng-cheng (蒙城) districts, the lower part is composed of quartzite and shaly sandstone and estimated at about 100 m. in thickness, the upper part of gray-green thinbedded limestone with shale, with a thickness of less than 100 m. At Shunkeng-shan (舜耕山) the lower part is missing and the upper part contains siliceous limestone and shale, amounting to about 150 m. in thickness. In the Ssu-hsien (泗縣) district, Anhuei, and Pei-hsien (沛縣) district, Kiangsu, only the lower part is found, comprising quartzite with sandstone, sandy shale and shale. But in the Suei-ning (or Suining 睢寧) and Ling-pi districts and some part of the Ssu-hsien district occurs only the upper part which contains siliceous limestone with thinbedded limestone and yellow shale. In the Yishui (沂水) district, Shan-tung, the lower part consists chiefly of white quartzite, white and reddish sandstone, brown shaly sandstone, red-brown and grey-green shale and conglomerate, with the total thickness of form 20 to 50 m. In other parts of Shantung where the Sinian system occurs, only the upper part is found and composed chiefly of siliceous limestone with greenish and brown shales and sandstones, the thickness being from 10 to 50 m[3]." "The distribution of the Sinian system is confined to the regions north ot the Huai-yangshan (淮陽山) Range. Owing to its having small thickness the system composes only some low hills and in some places forms one part of the hills and mountains."

In the geology of Kiansu, Liu and Chao[4] denominated the lower quartzite as Chengshan (城山) and the upper limestone as Mianshan (綿山). In the area surveyed by them, 120 m. and 480 m. are the average thickness of the two series respectively. The Chengshan contains some hematite. They inclined to correlate the Mianshan with the Tayang limestone of Shansi or the Nankou limestone of Chihli.

Judging from the observations so far gathered by various geologists, the Sinian system is widely distributed in the region but varies in thickness. It is thickest in the Fengyang district where it attains 550 m. In the southern part of the terrain it is represented by the Chengshan quartzite and the Mianshan limestone which tends to be interbedded with the shale toward the north. Going farther to the north the I-chou series is overlain by the Manto formation, which is thick in the southern part of the Western Shantung mountain block and contains shales and some limestones, but thins out toward the north and northeast until it practi-

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1) H. C. Tan: (1924), Geological Map of China (Scale 1/1,000,000) and its Explanatory Text. Peking-Tsinan Sheet, p. 3.

2) C. Li: (1929), Op. cit., p. 3.

3) The dense limestone with high specific gravity is utilized i tnhe vicinity of Yukou (漁溝) for the musical instrument called Ching (磬).

4) C. C. Liu and J. C. Chao: (1924), A Preliminary Report on the Geology and the Mineral Resources of Kiangsu. Mem. Geol. Surv. China, ser. A, no. 4.

cally disappears. It is most probable that the I-chou series belong to the top division of the Sinian, if not the basal part of the Cambrian system. The Mianshan which is frequently siliceous, is Middle Sinian and the Chengshan, Lower Sinian. In other words, the lower and middle divisions of the Sinian System are developed in the southern and central parts. The middle division probably merges upward with the upper in advancing from the central to the northern part of the region and farther to the north only the upper division is present, which thins out toward the northeast.

5) *Shankiangan Basin*:—Judging from our existing knowledge the Sinian in Northern Kiangsu and Northern Anhui belongs to the lower and middle divisions, but that in Western Shantung may belong to the upper one. It is thickest at Fengyang district but dies out toward the northern and eastern sides of the Western Shantung block. The Cambrian system is on the other hand thick in southern part of Western Shantung where LI estimated it to be 700 m. thick but thins out toward south. It is about 400 m. thick at Tangshan and about 300 m. thick at Fengshan, and abruptly decreases in thickness in the west side of Northern Anhui. According to LI the Cambrian is represented by several tens of meters of strata at Kuoyang and Mengcheng. Similar change of thickness can be seen in the northeastern border of Western Shantung. The Cambrian formation generally ranges from about 300 m. to 650 m. in thickness and 350 m. is the average thickness of the Ordovician formation in Western Shantung. But according to YAMANE the Cambro-Ordovician formations measure only about 140 m. in thickness in the eastern margin of the Western Shantung block.

The change of the thickness of the Sinian system shows that the area involving Western Shantung, Northern Kiangsu and Northern Anhui is a basin which is separated from the Heinan-Kuantung geosyncline by a peninsula extending from the Keiki-land to Shantung. Therefore taking the first syllables of the three provinces the area is called the Shankiangan (山江安) basin. Through the Sinian period the outline of the basin shifted to the north till at length the center of the basin changed from Fengyan to I-chou. It is certain that the basin was closely connected with the geosyncline in the Cambro-Ordovician period and the physical condition was not so different as before. The Eastern Shantung block stood above the water-level all the time except in its northeastern margin which, it is possible, subsided once in the Sinian period.

To the south of the Weiyanshan range there is the Lunshan (崙山) limestone containing the Wolungian fossils. It is 900 m. thick and is overlain by the Tangshan (湯山) shale and limestone formation, 30 to 40 m. thick, which yields *Orthoceras chinense*. Above this there are the graptolite shales of the late Ordovician and early Gotlandian ages, and the graptolite facies extends to the middle and lower parts of the Ordovician system to the east and south of Nanking. Therefore it is certain that the Tsingling-Keijo line[1] which is the Ordovician geographic boundary of prime importance passed through the Weiyangshan range. The occurrence of the Wolungian fossils in the Lunshan limestone shows that the cephalopods could intermittently migrate through the boundary. The Lower Ordovician trilobite fauna in the Yangtze Valley is related to the Tomkol fauna in South Chosen on one side and to the Lower Ordovician ones in Burma and Indo-china on the other. The rocks of the period in Chekiang and other parts of the Lower Yangtze Valley insofar as I can judge from their description, are similar to those of the Tomkol series.

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[1] T. KOBAYASHI: (1930), Cambrian and Ordovician Faunas of South Korea and the Bearing of the Tsingling-Keijo Line on Ordovician Palaeogeography. Proc. Imp. Acad. Tokyo, vol. 6.

The reference of the formation below the Tomkol equivalent to the Sinian system is merely a conjecture. The formation in question is characterized by inclusion of black carbonaceous shales which alternate with thin layers of calcareous shale and limestone. This part of the formation appears to suggest that the Machari formation of South Chosen is traceable to the west into the lower Yangtze Valley. This suggestion is emphasized by the fact that *Lopnorites* which is a characteristic genus of trilobite in the upper Machari formation is known to occur at Lan-hsi, Chen-chou-fu in the Province of Hunan, as reported in my previous paper[1]. Therefore, in my opinion, the formation adjacently below the Ordovician in the lower Yangtze Valley is more probably the Cambrian instead of the Sinian as considered by Chinese geologists, and the faunas contained is expected to be similar to those of South Chosen and especially of the Neietsu district. In other words the Weiyanshan may be a geographical boundary not only in the Ordovician but also in the Cambrian period.

## 安徽省北部に於ける崮山階三葉蟲の發見と山江安盆地の樂浪累系に就いて（摘要）

小　貞　一

**最近德田貞一博士より安徽省淮南九龍崗産の化石の寄贈を受けたので研究結果**

*Blackwelderia monkei* (Walcott)
*Drepanura premesnili* Monke
*Teinistion lansi* (Monke)

の 3 種を識別し得，此の地に崮山階の分布する事が判明した。安徽省定遠・鳳陽から知られて居る寒武系層序は此の地方から，現在知られて居る最良のものであるが，此の內には崮山階は知られて居ない。定遠・鳳陽地方の層序に關して私見を述べ，更に安徽北部・江蘇北部の寒武奥陶系層序に關する事實を摘要し，更に安徽北部・江蘇北部・山東西部の震旦系に關する事實を綜括し，震旦紀には平南・遼東地向斜の南方に 1 盆地が存在した事を明かにす。此の盆地を 3 省名に因み。山江安 (Shankiangan) 盆地と命名する。震旦紀少くとも其の前半には本盆地と該地向斜との間には東南より凸出せる半島があつたが，震旦紀末に向ひ，此の半島の尖端は次第に沈降し，寒武奥陶紀になると，山東の濰沂線以東のみが水面上にあつた。奥陶紀古地理上に於ける秦岺—京城線の意義に關しては既に私見を發表した處であるが，玆に本線の南側にある揚子江下流には，沃川地向斜の寧越型の寒武系が期待される事に言及す。

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[1] T. Kobayashi: (1938), An Occurrence of *Lopnorites* in Hunan, China. Jour. Geol. Soc. Japan, vol. 45.

# *A New Naiad, Unio (Nippononaia) ryosekiana, n. subgen. and n. sp., from the Lower Cretaceous of Japan**

By

**Koiti SUZUKI**

Contribution from the Geological Institute, Faculty of Science, Imperial University of Tokyo.

(Received May 20 th ; read May 24 th., 1941.)

Recently Prof. T. NAGAO submitted to the writer two specimens of an interesting fossil naiad in his old collection for study. According to him, it is certain that these specimens were collected by himself from the Ryôseki group which is the basal part of the Early Cretaceous Monobegawa series, but its locality is uncertain whether it was Komô, Hanoura-mati, Naka-gun, Tokusima Prefecture, or somewhere in the Santyû graben in the Kwantô mountainland. There are a large number of fossils procured from various localities of the group in Japan and kept in the Geological Institute, Imperial University of Tokyo. They are now placed at the writer's disposal for study, but none of these collections contain this species.

One of the two specimens which NAGAO sent to me is an internal mould of a left valve wanting the posterior end. It clearly shows features of the hinge-teeth which consist of two short, narrow pseudo-cardinal and two long, lamellar and smooth lateral teeth. Fine but distinct crenulation is found on the inner side of the ventral margin. The other specimen is an external mould of the left valve of a different individual. Its posterior and dorsal parts are not preserved, but the surface is ornamented by numerous radiating ribs which cover the whole of the disc. Some of them converge to form a series of acute V in the middle of the disc.

Judging from the outline and features of the hinge, this shell may be referred to the genus *Unio*. Its surface ornament is, however, quite different from that of *Unio*, resembling closely to the ornament of certain forms of the South American genera, *Diplodon*, *Prisodon* and some others, in the subfamily Hyriinae, or of *Trigonioides kodairai* KOBAYASHI and SUZUKI[1], a trigonid from the Lower Cretaceous formations of Tyôsen (Korea) and Manchoukuo. No specimen of *Unio* has such distinctly radiating and widely spreading ribs as in this shell. Especially the marked crenulation of the inner side of the ventral margin as in this shell is entirely missing in *Unio* and is very rarely, though not at all, met with in the subfamily Unioninae as a whole. By these reasons, a new subgenus is instituted here in genus *Unio* on the basis of a new species, *U. (Nippononaia) ryosekiana*.

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[1] *Trigonioides kodairai* T. KOBAYASHI and K. SUZUKI, 1936: Non-Marine Shells of the Naktong-Wakino Series, (Japan. Jour. Geol. Geogr., vol. 13,) p. 249, pl. 27, figs. 1-4, pl. 29, fig. 13.

The shell of the genus *Parreysia*[1] possesses the hinge-teeth similar to those of the present Japanese fossil shell and often the radiating ornament somewhat resembling that of this, but the former shell is generally much higher than the latter. Moreover, the radial ornament of *Parreysia* is in the adult stage always confined to the umbonal region and consists usually of criss cross or zig zag ribs. Having the soft parts of the structure essentially of the North American genus *Quadrula*, *Parreysia* is quite distinct from *Unio*. However, the conchological criteria of these two genera are at present fairly obscure and it may not be easy to decide whether the present new subgenus *Nippononaia* really belongs to the genus *Unio* or to *Parreysia*. Nevertheless the outline and dentition of *Nippononaia* appear to suggest its closer affinities to *Unio* rather than to *Parreysia*. The recent representatives of *Parreysia* are widely distributed in India, Burma, southern China (?) and the tropical Africa, and the fossil ones are recorded from the Cenozoic formations in India and Burma.

*Unio edwini* GUPTA[2] described from the younger Tertiary formations of Burma has the surface ornament of a nature fairly similar to that of *Nippononaia*. Because it has an ovately subtrigonal outline and the radial ribs more or less broken into granulation, it may probably be referred to the genus *Parreysia*, though detailed features of its dentition are not known and its subgenus or section in the genus is uncertain.

The writer wishes to acknowledge his indebtedness to Prof. Takumi NAGAO of the Department of Geology and Mineralogy, Hokkaidô Imperial University, who kindly gifted the specimens of this interesting shell to the writer. Thanks are also due to Prof. Teiichi KOBAYASHI of the Geological Institute, Imperial University of Tokyo, for reading over the manuscript.

## Genus ***Unio*** "PHILIPPSON" RETZIUS, 1788.

1788. *Unio* PHILIPPSON, in RETZIUS, Dissertatio historico-naturalis sistens nova Testaceorum genera, p. 16.
1853. *Nodularia* CONRAD, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, p. 268. Monotype: *Unio douglasiae* GRIFFITH and PIDGEON.

Type :—*Unio pictorum* LINNÉ (designated by GRAY, 1847).

## Subgenus ***Nippononaia*** SUZUKI, new subgenus.

Diagnosis.—Shell of medium size, elongated subelliptical in outline, anterior part usually shorter than posterior; surface ornamented by numerous radiating ribs, middle ones of which converge to form acute Vs on a line across the beak; inner side of ventral margin finely crenulated; hinge-teeth of left valve typical of genus in the presence of two short and narrow cardinals and tow long, lamellar and smooth laterals.

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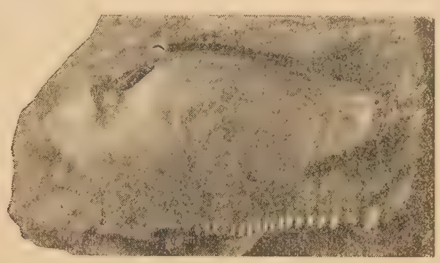
[1] B. PRASHAD, 1919: Studies on the Anatomy of Indian Mollusca, no. 3, the Soft Parts of Some Indian Unionidae, (Records Indian Mus., vol. 16,) p. 292.

H. A. PILSBRY and J. BEQUAERT, 1927: The Aquatic Mollusks of the Belgian Congo, with a Geographical and Ecological Account of Congo Malacology, (Bull. Amer. Mus. Nat. Hist., vol. 53,) pp. 388, 389.

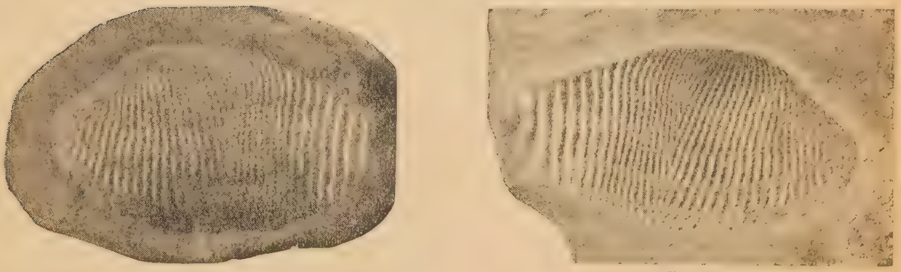
[2] *Unio edwini*, *U. edwini* var. 1 and *U. edwini* var. 2 B. B. GUPTA, 1930: Two New Species of *Unio*, (Records Geol. Surv. India, vol. 63,) pp. 210–212, pl. 5, figs. 2–4, 6–9.

Type.—*Unio* (*Nippononaia*) *ryosekiana* Suzuki, new subgenus and new species.

Remarks.—This subgenus can be easily distinguished from *Unio* s. s. and the other subgenus of *Unio*, *Cafferia*[1] in Africa, by the V-shaped radial ornament covering the whole of the disc and by the crenulated inner side of the ventral margin. It differs also form the Indo-African genus *Parreysia*[2] in having the transversely elongated outline and the above stated characteristic sculptures, both external and internal. Some South American genera in the subfamily Hyriinae often possess the radiating ornament recalling this new subgenus of *Unio*, but their dentition is quite different from that of this subgenus.



1. Holotype



2. Plaster-cast of the paratype specimen

3. Paratype

Text-figures 1–3. *Unio* (*Nippononaia*) *ryosekiana* Suzuki, new subgenus and new species; Ryôseki group, the basal part of the Early Cretaceous Monobegawa series; Komô, Hanoura-mati, Naka-gun, Tokusima Prefecture, or Santyû graben in the Kwantô mountainland. ×1.5.

### *Unio* (*Nippononaia*) *ryosekiana* Suzuki, new subgenus and new species.

Text-figures 1–3.

Description.—Shell medium in size, transversely elongated, subelliptical in outline, about twice as long as high, inequilateral, short and rounded in front, produced behind. Postero-dorsal margin fairly long, gently sloping, subparallel to ventral and slightly curved; ventral margin straightened, even slightly sinuated in middle, and gradually going over into the rounded anterior; antero-dorsal

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1) *Nodularia* section *Cafferia* Ch. T. Simpson, 1900: Synopsis of the Naiades or Pearly Fresh-Water Mussels, (Proc. U. S. Nat. Mus., vol. 22,) p. 824. Type by original designation: *Unio caffer* Krauss.

*Unio* section *Cafferia* Ch. T. Simpson, 1914: A Descriptive Catalogue of the Naiades or Pearly Fresh-Water Mussels, p. 574.

2) *Parreysia* T. A. Conrad, 1853: Synopsis of the Family Naiades, (Proc. Acad. Nat. Sci. Philadelphia, vol. 6,) p. 267. Monotype: *Unio multidentatus* "Parreyss" Philippi [=*Mya corrugata* Müller].

margin relatively short, sloping and very weakly arched. Beak probably not high, placed at point about one-third of length of shell as measured from anterior extremity. Surface ornamented with many radiating ribs crossed by concentric lines of growth; radial ribs fine and closely set in middle of disc, but getting distinct and widely spaced towards both ends, especially backwards; several ribs in middle converging to form acute Vs on a line through beak, and on each side of them about fifteen ribs not meeting; ribs on the antero-dorsal area fine and branching off downwards from a line running from beak to antero-ventral margin; lines of growth very fine, but closely set and elevated at irregular intervals, representing succesive periods of growth. Hinge of left valve well developed; cardinal teeth relativly short, narrow and very finely crenated, the lower one stronger than upper; lateral teeth long, lamellar, smooth, almost conglutinated into a broad tooth near beak, upper one much narrower than lower. Beak-cavity not deep. Inner side of shell markedly crenulated on ventral margin, especially in posterior half.

Type specimens.—Holotype: Internal mould of a left valve wanting the posterior end (tex-fig. 1). Paratype: External mould of another left valve wanting the dorsal and posterior parts (text-fig. 3). Both of these type specimens are kept in the Geological Institute, Faculty of Science, Imperial University of Tokyo.

Measurements.—The holotype specimen is about 33 mm. long and about 16 mm. high.

Formation and locality.—Ryôseki group, the basal part of the Early Cretaceous Monobegawa series; Komô, Hanoura-mati, Naka-gun, Tokusima Prefecture, or Santyû graben in the Kwantô mountainland.

Remarks.—The ornament of the postero-dorsal area can not well be observed. As clearly shown on the small external mould of the holotypic left valve, the presence of many fine and closely set radial ribs on the postero-dorsal marginal surface suggests that the postero-dorsal area of this shell is marked by many radial ribs either continued from those of the posterior half of the disc or branched off from the posterior ridge toward the postero-dorsal margin.

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## 本邦下部白堊系産の新イシガヒ類 *Unio* (*Nippononaia*) *ryosekiana*（新亞屬•新種）（摘要）

鈴　木　好　一

最近長尾巧教授より贈與された領石群層産の貝化石 2 箇を研究した所，外形及び殼齒は *Unio* 屬，特に東亞産 *U. douglasiae* Griffith and Pidgeon 群のものに一致するが，殼表の放射狀彫刻は狹義の *Unio* 屬のものとは著しく異り，寧ろ Hyriinae に屬する南米産諸屬 *Diplodon*, *Prisodon* 等，もしくは朝鮮•滿洲の下部白堊系産 *Trigonioides kodairai* Kobayashi and Suzuki のそれに酷似することを知つた。又 *Parreysia* 屬のあるものも本化石に類似した放射狀彫刻を有することがあるが，通常外形及び殼齒によつて容易に區別される。よつて本化石に基いて *Unio* 屬中に 1 新亞屬を設立し，此化石種を *Unio* (*Nippononaia*) *ryosekiana* Suzuki，新亞屬•新種，と命名する。

尙此化石の産地は，徳島縣羽ノ浦町古毛か山中地溝帶中か不明になつたとのことであるが，何れにせよ下部白堊系物部川統の下部，所謂領石群層中に産したものであることだけは確であらう。

# 比律賓ミンドロ島の化石孤生珊瑚類*

理學士 江口元起

(昭和 16 年 5 月 24 日講演並に受理)

比律賓各地には第三紀の各時代に亙る，珊瑚石灰岩が廣く發達して居る事が知られ1)，一方砂岩頁岩層中には孤生珊瑚の存在が知られて居る。現在の珊瑚類は珊瑚礁地方として，古くより著名で L. A. Faustino2) 氏其他の研究があり，特に其の南方 Sulu 海には世界の海で最も豐富な深海珊瑚産地がある (Siboga st. 95)。然るに化石珊瑚類は未だ凡ど調べられて居ない。

珊瑚石灰岩層に對し，深海珊瑚層とも稱す可きは Mindanao 島に知られた所謂 Banisilan formation3) で *Flabellum distinctum* Milne-Edwards et Haime (*Fl.* cf. *australe* Moseley), *Balanophyllia* sp.; *Fungia* (*Cycloseris*) sp. 等があり，又 Masbate 島より *F. distinctum*, *Odontocyathus spiniger* Marenzeller (*O. coloradus* Smith)4) を含む地層がある。*Heterocyathus aeguicostatus* Milne-Edwards et Haime (*H. parasiticus* Semper, *H. philippinensis* Semper), *Heteropsammia ovalis* Semper は 1872 年 C. Semper 氏5) の化石として報告せる種で恐らく同様な地層であらう。其他保存狀態良好でない材料で圖示又は簡單に記載された *Caryophyllia*? *Montlivaultia*? *Pattalophyllia*? 等の 2,3 の孤生珊瑚もある。

第 1 表 Systematic list of simple corals from the Sumagui formation of Sumagui, Bongabon, Mindoro, Philippines.

Turbinolidae
- 1. *Acanthocyathus grayi* Milne-Edwards et Haime
- 2. *Citharocyathus conicus* Alcock
- 3. *Heterocyathus aeguicystatus* Milne-Edwards et Haime
- 4. *Trochocyathus* (*Thecocyathus*) *hanzawai* Yabe and Eguchi

Anthemiphylliadae
- 5. *Anthemiphyllia dentatus* (Alcock)

Eupsammidae
- 6. *Balanophyllia gigas* (Brüggeman)
- 7. *Heteropsammia michelinii* Milne-Edwards et Haime

Mussidae
- 8. *Acanthophyllia* cf. *deshayesiana* Michelin

Fungidae
- 9. *Fungia* aff. *patelliformis* Boschma?
- 10. *Fungia* sp.

Faviidae
- 11. *Goniastrea* aff. *retiformis* (Lamark)

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* Transactions of the Palaeontological Society of Japan, No. 129.

1) 橋本 亘: 1939, 比律賓群島層位概説. 矢部教授還暦記念論文集 1, p. 281.

2) Faustino, L. A.: 1927, Recent Madreporaria of the Philippine Islands. Monograph 22 of the Bureau of Science, Manila, Philippine Islands.

3) Dickerson, R. A.; 1922, Review of Philippine Palaeontology. Philippine Journ. Sc., Vol. 20, No. 2, p. 217.

4) Smith, W. D.: 1913, Contribution to the Stratigraphy and Fossil Invertebrate Fauna of the Philippine Islands. Philippine Journ. Sc., Vol. 8, No. 4.

5) Semper, C.: 1872, Generationswechsel bei Steinkorallen. Zeitsch. für wiss. Zool., Vol. 22.

深海珊瑚類は造礁珊瑚の如く岩礁其他の固い着生基盤の有る海底のみならず，造礁珊瑚の生活し得ない數千 m の深海にも普通に見る珊瑚であるが，砂質・泥質等の熱帶地方の淺海にも總て造礁珊瑚に代つて生育を續ける。分布も廣く，日本近海の如きは津輕海峽以南の各地に普通に知られる。從つて化石も意外に廣く各地に採集される。

此處に取扱つた材料は橋本亘理學士[1]により比律賓，Mindoro 島の同氏の Sumagui formation より採集されたもので，東北帝大地質學古生物學教室所藏の資料である。橋本氏によれば Campagna 河の瀧附近の砂質泥岩及石灰質砂岩中に產するもので腕足類・貝類と共に *Flabellum transversale* Moseley が含まれる。

筆者の鑑定し得た種には第 1 表に示したものがある。

上記 11 種中，最後の種のみが群體を形成する造礁珊瑚の磨滅した礫で，橋本氏報告中にある *Flabellum transversale* を加へ 7 科 11 種の孤生珊瑚がある。草芝石科 Fungidae の中 *Fungia* 屬は普通珊瑚礁上にも見るもので造礁珊瑚として取扱はれる。*Acanthophyllta* 屬[2]は現在のところ 1 屬 1 種しか知られて居ないが *Protolobophyllia* 屬，*Antillophyllia* 屬等と甚だ似た構造の現世の孤生珊瑚で，珊瑚體の構造よりも比較的淺海の棲息者と思へる。化石として此處に始めて知られた *Flabellum transversale* と共に結局 9 種が所謂深海珊瑚で日本近海の例では 100-300 m に最も多く棲息して居る。その中 *Trochocyathus hanzawai* のみは未だ現在の海より知られてゐない。Faustino 氏[3]の總括的な比律賓產現世珊瑚の研究中に記されない 12 種は矢部先生と筆者の日本近海產の孤生珊瑚中に取扱つた樣に分布の北限は日本近海にまで及ぶ物で比律賓にも今後の調査で，生棲地が知られる可能性がある。從つて 9 種の深海珊瑚中 8 種は比律賓近海の現棲種と見なし得る。比律賓より知られた在來の種（× 印）も同時に第 2 表に記し，其の現在の分布・水深 (m) を示した。最も詳細に判明して居るのは水產試驗所の蒼鷹丸採集品[4]，其他新野理學士の關係された資料

第 2 表 Distribution of "Deep-Water" corals from the Sumagui formation of Mindoro Island, Philippines.

| | Japan | Philippines | East Indies | Indian Sea | Kikaizima (foss.) |
|---|---|---|---|---|---|
| *Flabellum transversale* | 17-344 m | 60-522 m | 50-100 m | 100 m | * |
| *Acanthocyathus grayi* | 150 m? | ? | ? | 30-370 m | |
| *Citharocyathus conicus* | 106-110 m | 522 m | 300 m | | * |
| *Heterocyathus aequirostatus* | 102-658 m | 10- 40 m | * | * | * |
| *Trochocyathus hanzawai* | extinct ? | | | | * |
| *Anthemiphyllia dentatus* | 75-307 m | 350-522 m | | | * |
| *Balanophyllia gigas* | 115-234 m | ? | 90 m | | * |
| *Heteropsammia michelini* | | 12- 60 m | 22 -75 m | * | |
| ×*Flabellum distinctum* | 73-658 m | * | 180-289 m | * | * |
| ×*Odontocyathus spiniger* | 126-300 m | ? | 611-560 m | | |
| ×*Heteropsammia ovalis* | extinct | | | | * |

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[1] 橋本　亘：1939, 前揭, p. 402.

[2] Wells, J. W.: 1937, Five New Genera of the Madreporaria, Coral Studies 11. Bull. American Paleontology, Vol. 23, No. 79, p. 8.

[3] Faustino, L. A.: 1927, Op. cit.

[4] Yabe, H. and Eguchi, M.: 1932, A Study of Recent Deep-Water Coral from Japan. Proc. Imp. Acad., Vol. VIII, No. 8.

である。日本近海の材料は矢部先生と筆者の未發表原稿1)から引用した。詳細は他の機會にゆづる。表中の ? は蘭印又は印度洋と日本近海に在つて比律賓近海よりの報告を缺くもの，* 印は水深の記錄されなかつたもの，同時に右端は喜界島の琉球石灰岩中2)にも知られる共通種を示す。

深海珊瑚の珊瑚自身の示す特性は深海性であるが，*Fungia*, *Heteropsammia* 等の混在より造礁珊瑚の繁殖盛んなところより多少深い砂泥底の淺海層を示す物と考へられる。水深も喜界島の琉球石灰岩の深海珊瑚層と同様 100 m 以淺 50–60 m 位で熱帶地方堆積層と稱し得る。*Fl. transversale* 以外は總て房州以南及び五島以南に多い種のみで，現在知らるる各種の分布北限は *Fl. transversale* は津輕海峽，*Acanthocyathus grayi* は和歌山縣瀬戸沖，*Citharocyathus conicus* は豐後水道，*Heterocyathus aequicostatus* は日本海岸島根縣沖・外房州，*Balanophyllia gigas* は千葉縣勝浦沖，*Heteropsammia michelini* は支那海，*H. aequicostatus* のみが比律賓の他の島 Luzon 島，Mindanao 島等より化石として報告されて居る。Sulu 海の南端の Talaud3) の隆起泥灰岩層，Java の新第三紀層，臺灣苗栗附近の苗栗層，喜界島の琉球石灰岩，静岡縣掛川附近の鮮新統，神奈川縣及千葉縣の更新統及鮮新統等にも分布する。蘭印，Java, Sumatra, Ceram, Borneo 等の中新統以後の地層中には深海珊瑚層の知られたものが相當あり H. Gerth, J. Felix, J. H. F. Umbgrove 氏等の研究があるが Mindoro 島の珊瑚と共通種は少い。本種以外は僅かに *Acanthocyathus grayi* (*A. malayicus* をも含む), *Balanophyllia imperialis* (*B. gigas* に甚だ似た種) があるのみで，共通種はかへつて喜界島の琉球石灰岩層中に最も多い點は興味を索く。

日本の各地には深海珊瑚層の要素を含む地層が各時代に亙り相當廣く發達して居り，在來筆者の觀察し得た物のみでも，古くは樺太・北海道・九州北部・四國等の上部白堊紀層に在り，古第三期層には北九州に，新第三期層以後更新世の地層では臺灣苗栗附近，沖繩島の島尻層，喜界島の琉球石灰岩，鹿兒島附近吉田村，宮崎附近の綾村，高知縣唐ノ濱附近，島根縣豐田村，岐阜縣日吉村附近，静岡縣掛川附近及久能山附近，神奈川縣・千葉縣の更新層，福島縣梁川附近，宮城縣茂庭附近，青森縣小泊附近等がある。然して相當良く知らるるに致つた現在の深海珊瑚の研究に伴ひ各絶滅種の % 等により層位學上にも意外の價値あるものと考へる。

取扱つた材料は總て東北帝大理學部地質學古生物學教室所藏の資料で，恩師矢部長克先生の御指導を受け此の結果を出し得た。尚同教室の標本及文獻を自由に使用させて頂いた青木廉二郎・半澤正四郎兩教授，並びに種々有益な御助言を頂いた杉山敏郎博士及同教室諸先生方に深謝する。

## On Some Simple Corals from Mindoro Island, Philippines.

(Résumé)

By

Motoki Eguchi

The simple corals were collected by Mr. W. Hashimoto from the Sumagui formation developed

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1) Yabe, H. and Eguchi, M.: 1941, Recent and Fossil Simple Corals from Japan. (M. S.)

2) Yabe, H. and Eguchi, M.: 1932, Deep-Water Corals from the Riukiu Limestone of Kikai-zima, Riukiu Group. Proc. Imp. Acad., Vol. VIII, No. 9.

3) Umbgrove, J. H. F.: 1938, Corals from an Elevated Marl of Talaud (East Indies). Zoologische Mededeelingen, XX.

on Mindoro Island in the Philippines. His collection proved to contain the following species: *Falbellum transversale* MOSELEY, *Acanthocyathus grayi* MILNE-EDWARDS et HAIME, *Citharocyathus conicus* ALCOCK, *Heterocyathus aequicostatus* MILNE-EDWARDS et HAIME, *Anthemiphyllia dentatus* (ALCOCK), *Acanthophyllia* cf. *deshayesiana* MICHELIN, *Trochocyathus* (*Thecocyathus*) *hanzawai* YABE et EGUCHI, *Heteropsammia michelinii* MILNE-EDWARDS et HAIME, *Balanophyllia gigas* (BRÜGGEMAN) HORST, *Goniastrea* aff. *retiformis* LAMARCK, *Fungia* sp. (broken fragment), *Fungia* sp. (Cycloseris form), and *F.* aff. *patelliformis* BOSCHMA. The last mentioned three are reef-building corals, and the others are all deep-sea corals.

All except *Trochocyathus* (*Thecocyathus*) *hanzawai* YABE et EGUCHI are now living in the adjacent waters of the Philippine Islands, and all except *Acanthocyathus grayi* MILNE-EDWARDS et HAIME, *Acanthophyllia* cf. *deshayesiana* MICHELIN and *Heteropsammia michelinii* MILNE-EDWARDS et HAIME are represented in the Ryûkyû limestone formation of Kikai-zima, Ryûkyû Islands.

*Acanthocyathus grayi*, according to UMBGROVE is a synonym *Acanthocyathus malayicus* GERTH, however, from a study of numerous specimens from the Pliocene deposits at Tônohama, Tosa Province, it is certain that the former is not a synonym of the latter.

Details will be published at a later date.

# *On Two Species of Simple Corals from Kagosima-ken, Kyûsyû*[*]

By

**Motoki Eguchi**

Contribution from the Sendai Kôtôkôgyô Gakkô, Sandai, Japan.

(Read and received May 24th, 1941.)

Recently S. Endô of the Institute of Geology and Palaeontology, Tôhoku Imperial University, during his collection of fossil plants from several localities near the city of Kagosima, Kagosima-gun, Kyûsyû, fortunately obtained some marine fossils, among which were discovered two species of simple corals.

Here the writer wishes to record his thanks to Emeritus Prof. H. Yabe of the Tôhoku Imperial University, Profs. R. Aoki and S. Hanzawa of the Institute of Geology and Palaeontology, Tôhoku Imperial University for kindly giving the writer the opportunity to study the simple corals. Deep gratitude is offered to Dr. K. Tsurumi, Dean of the Sendai Kôtôkôgyô Gakkô, for giving the writer permission to publish this article. Acknowledgements are also due to Mr. K. Kumagai for taking the necessary photographs.

Among the two corals, *Deltocyathus orientalis* Duncan, is known to be living in the waters around Japan, ranging from Aomori-ken at the north to the East Indies, Indian Ocean and Mediterranean Sea at the south and at the west. As fossil it is known from the Pliocene and Pleistocence of the Kwantô region of Central Japan, the Pliocene of Taiwan, Plio-Pleistocene of the Ryûkyû Islands, and from the Upper Pliocene of Ceram. The Present record of this coral from Unoki, Yosida-mura, Kagosima-gun, Kagosima-ken (Reg. No. 65019), is a new locality.

Although *Deltocyathus orientalis* is represented by only two specimens in the material from Unoki, it is remarkably abundant in the Ryûkyû limestone formation of Kikai-zima in the Ryûkyû Islands, it is expected to occur in larger numbers in the fossil layer at Unoki by future collection.

The other coral, *Heteropsammia* cf. *ovalis* Semper, which is from Kuwanomaru, Yosida-mura, Kagosima-gun (Reg. No. 65018), is not very well preserved, and although its generic position can be settled easily, its specific position is rather difficult owing to its being somewhat water-worn. *Heteropsammia ovalis* is known to occur from the Younger Cenozoic rocks of Mindanao in the Philippine Islands, Plio-Pleistocene of Ceram, Miocene of Java, Pliocene of Taiwan, Pliocene of Sikoku, Pliocene of the Kwantô region of Central Japan, and from the Plio-Pleistocene of the Ryûkyû Islands. As known at present, there are no living records of this interesting species.

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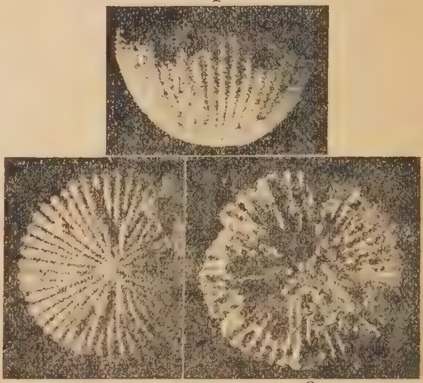
[*] Transactions of the Palaeontological Society of Japan, No. 130.

However, *Heteropsammia cochlea* (SPENGIER), a recent coral from the Philippine Islands in 25 fathoms, the East Indies in 15–83 meters, and also from off Seto-Kanayama, Wakayama-ken in 46 meters and from off Karatu, Saga-ken in 106 meters, is more or less similar to *Heteropsammia ovalis.* Also very closely related to the doubtful fossil from Kuwanomaru are *Heteropsammia ovalis formosensis* YABE and EGUCHI and *H. ovalis japonica* YABE and EGUCHI, the former from the Ryûkyû limestone formation of Kikai-zima, in the Ryûkyû Islands, and the latter from the Byôritu beds of Taiwan. If the present fossil were perfect, it appears that it might belong to *H. ovalis japonica. Heteropsammia* was also recorded by J. MAKIYAMA from the Pliocene Sasage beds of Tiba-ken.



*Deltocyathus orientalis* DUNCAN (x 5.)
From Unoki, Yosida-mura, Kagosima-ken. (Reg. No. 65018)
1: Lateral view, 2: Basal view,
3: Calicular view.

*Heteropsammia ovalis* and *Deltocyathus orientalis* occur together in the Ryûkyû limestone formation of Kikai-zima in the Ryûkyû Islands and in the Byôritu beds of Taiwan, elsewhere they are not known to occur in association. The geological age of the former mentioned formation is Plio-Pleistocene while that of the latter is Pliocene, thus the geological range of *Heteropsammia ovalis* is from the Miocene (of Java) to the Lower Pleistocene, while that of *Deltocyathus orientalis* is from the Pliocene to recent.

Both of the mentioned simple corals are not sedentary forms but belong to the free type, and therefore are generally restricted to sandy bottoms or to those consisting of fine material. Among the deep-sea corals the ones just mentioned belong to the shallow water forms and inhabit a sea-bottom generally within the depth of fifty meters, although there are still deeper records. Therefore, if a bold conclusion can be brought about, the writer believes that the shell-beds in which the present corals were found may not have been laid down at a depth not exceeding some fifty meters, seeing that the corals thrive in such a depth.

The geographical and geological distributions of the two corals mentioned above is as follows.

*Deltocyathus orientalis* DUNCAN1). Type locality:—Off Minosa-mati, Kitamuro-gun, Mie-ken. 52 fathoms.

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1) *Deltocyathus orientalis* DUNCAN, 1876, Proc. Zool. Soc. London, p. 431, pl. 38, figs. 4–7; YABE and EGUCHI: 1932, Proc. Imp. Acad., Vol. VIII, No. 8, p. 388; YABE and EGUCHI: 1932, Proc. Imp. Acad., Vol. VIII, No. 9. p. 442; YABE and EGUCHI: 1937, Sc. Rep. Tôhoku Imp. Univ., Sendai, 2nd Ser., Vol. XIX, No. 1, p. 135, pl. XX, figs. 1–10. *Deltocyathus lens* ALCOCK, 1902, Siboga Expeditie, Monographie, Vol. VII a, p. 19, pl. 11, figs. 16, 16a; GRAVIER: 1920, Res. Camp. Sc. Monaco, fasc LV, p. 36, pl. 3, figs. 47–54, pl. 13, figs. 200, 201; UMBGROVE: 1925, Report Pleistocene and Pliocene Corals from Ceram, p. 4, pl. 1, figs. 8–10.

Geographical distribution:—Aomori-ken, 152–168 m., Miyagi-ken, 40–344 m., Hukusima-ken, 170 m., Tiba-ken, 59–269 m., Sagami Bay, 106-446 m., Off Izu, 145 m., Suruga Bay, 188 mm., Kôti-ken, 106–344 m., Nagasaki-ken, 90 m., Simane-ken, 75–183 m., Hukui-ken, 113 m., Akita-ken, 93 m., Aomori-ken (Kyûroku-sima), 210 m., Philippine Islands, 522 m., East Indies, 590–397 m., Indian Ocean 4,914 m., Atlantic Ocean, 599–914 m.

Geological distribution:—Pliocene and Pleistocene of Tiba-ken, Pliocene of Kanagawa-ken, Pliocene of Ibaraki-ken, Pliocene of Kôti-ken, Pliocene of Taiwan, Upper Pliocene of Ceram, Plio-Pleistocene of Kikai-zima, Pliocene of Okinawa-zima, Ryûkyû Islands. Besides the present new locality of Unoki, Yosida-mura, Kagosima-gun, Kagosima-ken.

*Heteropsammia* cf. *ovalis* SEMPER[1]. Type locality of *H. ovalis*, Maasin on the coast of Agusan, Mindanao, Philippine Islands (Younger Cenozoic). Besides Kuwano-maru, Yosida-mura, Kagosima-gun, Kagosima-ken.

## 鹿兒島縣産化石孤生珊瑚2種（摘要）

江口元起

鹿兒島市外吉田村附近の含植物化石凝灰岩層の調査中，遠藤誠道博士は多數の海棲生物化石を採集された。其の中に *Deltocyathus orientalis* DUNCAN 及び *Heteropsammia* cf. *ovalis* SEMPER の2種の遊離孤生珊瑚がある。前者は吉田村鵜木より，後者は吉田村桑の丸よりの材料で，何れも小形で砂底又は泥質海底に遊離して生活する種である。*H.* cf. *ovalis* は磨滅して正確な鑑定は困難であるが *D. orientalis* は青森縣沖より蘭印地方，印度洋，大西洋にまで分布する興味ある種で化石としても鮮新統以後の各地に知られる。附近では大島郡喜界島の琉球石灰岩の異相とされる石灰質砂層中に最も多産する。新産地として，分布が興味を索くので現在の各地の水深を特に記した。

孤生珊瑚の様に密集して石灰岩を形成する代りに分布が廣いから今後各地の海成層中に知られるものと信ずる。又地層の對比には案外價値あるものがある。

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[1] *Heteropsammia ovalis* SEMPER, 1872, Generationswechsel bei Steinkorallen. Zeitschr. für wiss. Zool., Leipzig, Bd. XX, p. 266, pl. 20, figs. 11a, 11b; FAUSTINO: 1927, Recent Madreporia of the Philippine Islands. Monograph 22, Bureau of Science Manila, Philippine Islands, p. 238, pl. 76, figs. 9, 10.

# 日本古生物學會記事

## Proceedings of the Palaeontological Society of Japan

昭和 16 年 2 月 15 日　日本古生物學會第 22 回例會を東北帝國大學理學部地質學古生物學教室に於て開催す（參會者 29 名)。講演者並に講演題目次の如し。

| | |
|---|---|
| 高知縣佐川地方の上部古生層の有孔蟲化石に就いて | 藤本治義 |
| 滿洲に於ける二疊紀層及び石炭紀層の層位學的研究 | 半澤正四郎 |
| Two Species of *Temnopleurus* from the Narita Beds at Tako-mati, Tiba Prefecture | Syôzô Nisiyama |
| 滿洲間島省豆滿層の化石（代讀） | 長尾 巧・湊 正雄 |
| 兵庫縣養父郡の第三紀層と化石（代讀） | 大塚彌之助 |
| 北海道・樺太新生代產 *Turritella* に就いて（代讀） | 長尾 巧・藤岡一男 |
| On a *Phacops* (s.s.) found from the Nakazato Series (Middle Devonian) of the Kitakami Mountainland, Japan. | Toshio Sugiyama and Hirosi Okano |
| On the Dorypygellinae（代讀） | Teiichi Kobayashi |
| 本邦洪積世哺乳動物に就いて | 鹿間時夫 |
| Ueber einen neuen hydrochoeren Riesennager aus dem Pleistozän von Ekuador（代讀） | Franz Spillmann |
| 宮城縣圓田含珪藻土植物化石層に就いて | 奥津春生 |
| 北海道・樺太新生代植物の研究（第 5 報）（代讀） | 大石三郎・藤岡一男 |
| 鹿兒島縣哈良郡加治木町附近に發達する含植物化石層に就いて | 遠藤誠道 |

昭和 16 年 5 月 24 日　日本古生物學會第 23 回例會を東京帝國大學理學部地質學教室に於て開催す（參會者 15 名)。講演者並に講演題目次の如し。

| | |
|---|---|
| 日向高鍋層群の有孔蟲に就いて（代讀） | 大炊御門經輝 |
| 關東山地秩父系の有孔蟲化石の研究（代讀） | 藤本治義 |
| フイリツピン，ミンドロ島の化石孤生珊瑚類 | 江口元起 |
| On Two Species of Simple Corals from Kagosima-ken, Kyûsyû, Japan | Motoki Eguchi |
| On a New Form of the Genus *Labechiellata* from Tyôsen (Korea)（代讀） | Toshio Sugiyama |
| On Some Brachiopoda (Quaternary)（代讀） | Kotora M. Hatai |
| A Note on the Stratigraphic Position and Geological Age of the Setomae Beds, Iwate-ken（代讀） | Syôgo Yamamoto |
| 魚沼統の貝化石群（代讀） | 池邊展生 |
| 瀬棚統と多賀統の貝化石 2, 3 に就いて | 金原均二 |
| Ryôseki Fauna of the Yatusiro District, Central Kyûsyû | Koiti Suzuki |
| A New Naiad from the Lower Cretaceous of Japan | Koiti Suzuki |
| 蒙疆察南泥河灣の順序と化石の分布 | 大塚彌之助 |
| On Some Ordovician Nautiloids from Shuo-hsien in the Chimpei（晋北), Menchiang（蒙疆）(Sino-Mongolian Borderland)（代讀） | Teiichi Kobayashi |
| Occurrence of the Kushan Trilobites in Northern Anhui and a Note on the Rakuroan Complex（代讀） | Teiichi Kobayashi |
| A Miocene Fish from the Jôban Coal-field | Fuyuji Takai |

北海道・樺太產第三紀植物の 2,3 に就て（代讀） 大石三郎・藤岡一男
Some Interesting Cenozoic Plants from Japan Seidô Endô

## 日本動物命名法委員會報告 2.

日本動物命名法委員會の經過に關して，江崎委員長の報告あり，歐洲に戰亂勃發の爲，國際動物命名法委員會がその機能を停止するに至り，從つて國際命名規約に關し審議すべき問題の通告なく，又國内に於ても差當り議すべき事項もないので，日本動物學會第 16 回大會を機として開催の豫定であつた委員會も中止となつた。

昭和 15 年 12 月 1 日以降昭和 16 年 7 月 30 日迄の會員移動次の如し。

| | | | |
|---|---|---|---|
| 入會者 | 木村敏雄 | 小林國夫 | 志水次郎 |
| | 高木善三郎 | 松本與正 | |
| 退會者 | 飯塚保五郎（死亡） | 市川新松（死亡） | 金原信泰（死亡） |
| | 佐川榮次郎（死亡） | | |

## 日本古生物學會規則

1. 本會ハ日本地質學會ノ部會ニシテ日本古生物學會ト稱ス
2. 本會ハ古生物學及ビ之ニ關スル諸學科ノ進步ヲ助ケ斯學ノ普及ヲ圖ルヲ以テ目的トス
3. 本會ハ第2條ノ目的ヲ達スルタメニ總會及講演會ヲ開ク
4. 本會ノ紀事及ビ會員ノ寄稿ハ地質學雜誌ニ揭載シ，其ノ別刷ヲ日本地質學會々員ニアラザル本會々員ニ配布ス
5. 本會ノ會費ハ年額3圓トシ，日本地質學會々員ハ年額1圓トス，但シ一時ニ金100圓以上ヲ寄附セル者ヲ賛助會員ニ推ス
6. 本會ニ次ノ役員ヲ置ク

| | |
|---|---|
| 會長 | 1名 |
| 評議員 | 數名 |

7. 役員ノ任期ヲ1年トシ會員中ヨリ總會ニ於テ選擧ス

## 日本古生物學會役員

會長 槇山次郎

評議員 青木廉二郎 伊木常誠 井上禧之助 遠藤隆次
*大炊御門經輝 *大塚彌之助 大村一藏 加藤武夫 木村六郎
*小林貞一 立岩巖 中村新太郎 *長尾巧 *早坂一郎
*藤本治義 *槇山次郎 村上鈑藏 山根新次 *矢部長克
（* 常務委員）

事務所──編輯所
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日本古生物學會
（振替口座東京第84780番）

# Constitution of the Palaeontological Society of Japan.

Article 1. The Society shall be known as the Palaeontological Society of Japan. It forms a section of the Geological Society of Japan.

Article 2. The object of the Society is the promotion of palaeontology and related sciences.

Article 3. This Society to execute the scheme outlined under Article 2, shall hold annual meetings and discussions.

Article 4. Proceedings of the Society and articles for publication shall be published through the Journal of the Geological Society of Japan. Separates and circulations will be sent to members of the Palaeontological Society who are not members of the Geological Society of Japan.

Article 5. The annual dues of this Society is two dollars for the foreign members of the Society.

Article 6. This Society shall hold the following executives. President one person, Councillors several persons.

Article 7. The President and Councillors shall be elected annually. The President and Councillors shall be elected from the Society body by vote of its members. All elections shall be ballot.

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President Jirô MAKIYAMA

Councillors
Renjirô AOKI
Ichirô HAYASAKA
Tsunenaka IKI
Takeo KATÔ
Teiichi KOBAYASHI*
Hanzô MURAKAMI
Shintarô NAKAMURA
Ichizô ÔMURA
Iwao TATEIWA
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Ryuji ENDÔ
Haruyosi HUZIMOTO*
Kinosuke INOUYE
Rokurô KIMURA
Jirô MAKIYAMA*
Takumi NAGAO*
Tuneteru OINOMIKADO*
Yanosuke OTUKA*
Hisakatsu YABE*

(* Executive committee)

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